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Bacillus Necrophorus Infection in Swine*

By H. R. SCHWARZE, Springfield, Illinois

FOR the past year more or less material from herds of swine affected with necrobacillosis has been shipped to the State Biological Laboratory for diagnosis. Reports came from various parts of the state stating that this disease was causing great losses, in many instances destroying almost entire herds. Macroscopical examinations of the specimens shipped in many cases failed to show necrotic lesions. Further, microscopically, the necrophorus bacilli could not be demonstrated.

Taking the bacteriology of the bacillus necrophorus seriously under consideration, the absence of any necrotic lesions in many cases that clinically showed just as marked lesions of sickness as did those animals that really showed necrotic lesions, the question presented itself whether necrobacillosis in swine was a primary or secondary disease. As a consequence, the Department began to make some investigations along that line, both bacteriologically at the laboratory and in the field, holding as many postmortems as possible.[1]

The following are some of the cases the Department investigated both clinically in the field and bacteriologically at the laboratory:

Case No. 1. Organs from hogs were delivered at the laboratory for diagnosis from a herd that appeared to be badly infected with hog cholera. Examination of these organs showed several necrotic lesions with the usual cholera changes, only more marked. A trip was made to this farm to investigate the disease. We posted several of the sickest animals, but no necrotic lesions of any kind were found. However, a general septicemia presented itself, with what appeared to be cholera lesions. Material from these cases was taken to the laboratory for further investigation, and rabbits were inoculated with the material, the result being that they died in twenty-four hours. Examination of the blood and tissues demonstrated bacilli suisepticus, which were obtained in pure culture. Two shoats were inoculated at the same time, one with defibrinated blood and the other with the blood filtered through a Berkfield filter, the results being that both pigs developed cholera in seventy-eight days and died in thirteen and fourteen days, respectively. Postmortem lesions showed the usual hog-cholera lesions.

Case No. 2. A live pig was received at the laboratory from a herd that was supposed to be sick with cholera. The herd was vaccinated with anti-hog cholera serum, but the results did not seem satisfactory. Pigs apparently in good health at the time of vaccinating would develop the disease and die. The postmortem lesions described by the veterinarian seemed to indicate that these animals had necrobacillosis. The pig was killed, postmortem

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[1]In connection with these investigations, the Department wishes to thank Drs. McDonald and Huggins of the U. S. Bureau of Animal Industry for furnishing some of the material and so ably assisting in field postmortem work.

showing what are usually considered hog cholera lesions. No necrotic lesions were found.

Rabbits were inoculated with some of the material with results that they died in thirty-six hours. Examination of the blood and tissue showed bacilli suisepticus which were obtained in pure culture. No cholera was demonstrated.

Case No. 3. Part of a hog lung was received from a herd of hogs suspected of being infected with tuberculosis, the history being that the entire herd was sick. Macroscopical examination showed that the encapsulated material was not tubercular but rather an abscess formation. Microscopically, no tubercle bacilli were found. However, bacilli necrophorus were present in abundance, also a small bacilli morphologically similar to the bacillus pyogenes suis. Rabbits and guinea pigs were inoculated with some of the material, with the result that the rabbits died in twenty-four hours and the guinea pigs in thirty-six hours. Examination of the blood and tissues of these animals showed large numbers of bipolar staining organisms, which were demonstrated to be bacilli suisepticus.

Case No. 4. Two live pigs were received at the laboratory from two different farms where herds of hogs were infected with necrobacillosis. The clinical symptoms were: temperature of 104.5 and 103.8°; greatly emaciated; eyes gummed up; congestion of conjunctiva; a fair appetite; bowels slightly constipated. The pigs were killed and postmortem held. The lymph-glands were found to be slightly hemorrhagic and enlarged. The lungs showed several small pneumonic areas and the large intestines showed numerous patches, the size of a pin head to that of a bead of albuminous coagulation necrosis, the primary stage of the bacillus necrophorus causing tissue necrosis. The clinical symptom presented in these cases would indicate, without a doubt, that these animals had been sick for at least several weeks. The pathological lesions found in the lungs may have been there during the time of sickness. However, the necrotic infection in the intestinal tract was just taking place.

Rabbits were inoculated with some of the diseased material, the result being that they died in twenty-six hours. Examination of the blood showed numerous bipolar staining organisms which were demonstrated to be bacilli suisepticus.

Case No. 5. A small live sucking pig was received from a farm where a number of sows had farrowed about the same time. This pig showed a general erythemia with localized necrotic lesions on the lips, nose, feet and gums. The pig was killed. Autopsy failed to show any intestinal lesion. Rabbits and guinea pigs were inoculated with negative results. This place was not far from the laboratory. An autogenous bacterin was made to treat these animals. On arrival at this farm we learned that there had been 45 sucking pigs in the bunch, but that 15 had died and nearly all the rest were sick. The pigs were all treated with 2 m.m. of the bacterin, and instructions given the owner to keep us informed as to the results. We heard nothing from him for several weeks so called him up to find out what the results of the treatment was. He informed us that the pigs kept right on dying after the treatment, so thought he would try some of his own treatment. He made a watery solution of some dip he had and gave the pigs a good bath in it, with the result that he lost no more animals.

Case No. 6. Went to a farm to investigate the trouble in a herd of hogs in which the owners said they had noticed several pigs weighing about 30 to 40 pounds being off. They did not think that it was cholera. However, they had the herd vaccinated. The sick pigs did not improve and the disease developed gradually until they died. Further, animals that appeared in perfect health when vaccinated developed the disease, gradually became emaciated, coughed, abdomen tucked in, conjunctiva congested, eye-lids gummed up, showed some temperature, bowels in some were normal, others constipated and others diarrheal. The appetite remained fairly normal. One pig was killed, postmortem showing slight pneumonic areas in the lungs and the large intestines showing extensive necrotic lesions. Three other pigs were affected quite badly, so we had them shipped to the laboratory for experimental purposes. One of these animals was killed. Postmortem showed pneumonia with some small encapsulated abscesses. No other lesions were found. Microscopical examination of the abscess showed necrophorus

bacilli and a small bacillus morphologically similar to the bacillus pyogenes suis..

Rabbits inoculated with some of the material died in twenty-four hours. Examination of the blood tissues showed bacilli suisepticus in great numbers. The organism was obtained in pure culture and a bacterin prepared. Pigs Nos. 2 and 3 were treated with the bacterin. Pig No. 2 had developed the disease in a very severe form and pig No. 3 seemed to be running the usual course. Pig No. 2 died three days after treatment. Postmortem showed several large encapsulated abscesses in the lungs. Microscopical examination showed the bacillus necrophorus and a small rod-shaped bacillus, morphologically similar to the bacillus pyogenes suis. Rabbits inoculated with the material died in thirty-six hours. Examination of the blood and tissues showed large numbers of bipolar staining organisms which were demonstrated to be bacilli suisepticus.

The third pig showed improvement the next few days after treatment and kept gradually improving. The fifth day the dose of bacterin was repeated. In ten days this pig appeared in perfect health, the only abnormality noticeable being great emaciation but it soon took on flesh very fast.

Case No. 7. A live shoat was received at the laboratory from a farm where the owner had about 100 head of the same age. About 90 of the 100 had died up to that time. The other 8 or 10 were sick and the owner thought that they would also die, as they showed the same symptoms as the others. The clinical symptoms presented were great emaciation, eyelids glued shut, conjunctivitis, bowels constipated, hacking cough and slight nausea, appetite fair, temperature 105.7°. The nose was deformed, appeared like bull-nose. Examination of the mouth disclosed several necrotic areas. This animal generally appeared to be in very bad shape.

For experimental purposes, this animal was treated with a bacillus suisepticus bacterin, receiving 2 m.m. at one dose. The next day the temperature was down to 102.9°, and the animal appeared better. On the fourth day it received another treatment of 2 m.m. This animal gradually improved after the first treatment so that a favorable prognosis could be given the fifth day. In ten days the animal appeared to be well.

Case No. 8. Necrotic enteritis was reported on a farm where a herd of hogs had been vaccinated with anti-hog-cholera serum about fifteen days before any sickness or deaths occurred. We went out to this farm to make as many postmortems as the owner would permit. We killed the most severely infected pigs in the herd.

The first animal posted showed the usual hog-cholera lesions, but no necrotic lesions were found.

The second animal posted showed the usual hog-cholera lesions and several button ulcers in the cecum, but no other necrotic lesions were found.

The third pig was a small animal, so thought we would take it alive to the laboratory with other material taken from the other two cases, for further investigation.

At the laboratory, two pigs were inoculated with blood from these animals. One received 2 m.m. of Berkfield filtered serum, the other the plain defibrinated virus. Both of these animals developed hog cholera in seven days.

Rabbits and guinea pigs were inoculated at the same time with material taken from these pigs. They died in twenty-eight hours. Microscopical and cultural examination of the blood demonstrated the presence of the bacillus suisepticus.

Pig. No. 3 was kept alive in an isolated pen at the laboratory for further investigation. Four weeks previous to the time of making this investigation, there had been purchased 8 pigs weighing about 50 pounds each, for the purpose of testing out some anti-hog-cholera serum for its potency. These pigs were put in isolated pens on arrival at the laboratory with the intention of starting the test the next day. However, I was called unexpectedly to do some work in some other part of the state. As a consequence I did not get back to work on these pigs until two weeks later. I then started to make the test. Upon taking the temperatures of these animals, it was found that five of them had abnormally high temperatures. The second and third day the temperatures were again taken with the same results. At this time it was suspected that these animals had contracted cholera while at the laboratory. So they were vaccinated with the anti-hog-cholera serum alone method.

Four of the pigs carrying a high temperature died from acute hog cholera,

three to four days after treatment. Postmortem showed the usual hog-cholera lesions without any complications. At the same time, the sick pig from the country died. Postmortem showed the mucous membranes of the large intestines completely covered with necrotic lesions. No lesions of that character were found in any other part of the animal.

The fifth pig of the eight which showed a high temperature before treatment developed cholera in the more chronic form. The other three which showed normal temperatures at the time of vaccination remained in perfect health.

The sick pig from the country having died in the isolated pen which had not been cleaned and disinfected since its arrival and the postmortem lesions showing it to be infected with necrotic enteritis, it was decided to put the remaining four animals in the infected pen to see if they would contract the disease. In fourteen days the cholera pig died. Postmortem showed numerous lesions of necrotic enteritis in the large intestines and the usual chronic hog cholera lesions in other parts of the body. The remaining three animals continued in perfect health while in the infected pens for thirty-five days. Then it was noticed that one of these pigs was sick. The temperatures were found to be 109°. The temperatures of the other two were also found to be slightly high. The pigs were treated immediately with anti-hog-cholera serum alone again, with the result that the first sick pig died the next day, showing acute hog-cholera lesions without necrotic complications. The other two pigs have remained in good health in the infected pens up to the present date.

From investigations and limited experiments made with material from various parts of the state, it was observed from field postmortem work that in going into a sick herd of hogs and selecting animals that clinically showed most severe symptoms and holding autopsies, 50 per cent or more of the cases would not show any necrotic lesions, notwithstanding the fact that the clinical symptoms were as well marked in many cases as those that really showed necrotic lesions.

Laboratory examinations showed that in 50 per cent of the cases the bacillus suisepticus could be demonstrated. In a few cases hog cholera was found, and in some instances a complication of the two diseases was present.

The experiments carried on to infect pigs with necrobacillosis showed that the only successful transmission produced, was in a pig that was previously infected with cholera. So far we have been unable to infect healthy pigs by exposing them.

In giving the bacterin treatment to eight animals from different herds affected with necrobacillosis it was found that equally as good results were obtained with a bacillus suisepticus bacterin as from autogenous bacterins.

Taking into consideration the postmortem findings, the demonstration of swine plague and hog cholera in a large per cent of the cases and the results from bacterin treatment, it would seem that necrobacillosis, where the lesions are internal, especially of the lung and intestines is a secondary disease following swine plague and hog cholera. However, the local necrobacillosis, such as bull-nose, necrotic stomatitis, canker of the feet, etc., may be a local lesion primarily due to some abrasion of the skin or membranes, the necrophorus bacilli and other ubiquitous organisms gaining entrance in that way causing tissue necrosis.

PLANTS TO AVOID

Work with death camas (Zygadenus intermedius) shows it to be poisonous at all stages of its growth. The leaves are poisonous prior to blooming and at the blooming period all parts of the death camas are poisonous, the flower cluster being the most poisonous per unit weight of material, the tubers next, and then the leaves, while the stems are the least poisonous. After the plant has reached the seeding stage the seeds are the most poisonous. The tubers appear to be poisonous at all times but due to being from 4 to 6 inches below the surface of the ground they play no direct part in the poisoning of range animals.

Physiological tests made of extracts from the blue lupine (Lupinus sp.) leaves and flowers prior to seeding stage have shown them to be nontoxic to rabbits. In work with a species of goldenrod (Solidago spectabilis), which had been found to cause the death of a number of sheep the season before, it was found that the poisonous principle in the leaves is either potash or iron, or both.

Observations Concerning the Dissemination of Hog Cholera by Insects*

By M. DORSET, C. N. McBRYDE, W. B. NILE and I. H. RIETZ, Washington, D. C.

THE first statement that we have been able to find as to the role of insects in carrying hog cholera is contained in the classical publication from the Department of Agriculture, issued in 1889, entitled, "Hog Cholera, Its History, Nature and Treatment." Unfortunately, the author's name is not given. In my opinion it is a classic, and it is to be regretted that the author's name is not given. In my opinion it is a classic, and it is to be regretted that the author's name is not known. The publication states that insects "may transport hog cholera virus." So far as we know, however, since that time, 1889, down to the present, no systematic attempt has been made to determine what insects may convey hog cholera, or whether insects are an important channel for its transmission.

The number of different insects which might convey hog cholera, either mechanically, or through their bites, is very large. We know that the intervention of an insect is not necessary in order to spread cholera from one hog to another; that it spreads by direct contact, by what we call contagion. We thought, in view of the fact, that hog cholera did spread rapidly from hog to hog, without an insect being necessary to transmit it, that it was important to study the insects which might be capable of conveying cholera over considerable distances, and for that reason we have given very little study to hog lice. We did some work with the hog-louse in attempting to transmit the disease through it, and have never been successful, and I think others have likewise failed.

Role of Insects in Spread of Hog Cholera

The question that particularly interested us was, do insects play any part in spreading cholera from farm to farm, and are they in any way connected with the unusual and unexpected outbreak of cholera in a neighborhood, perhaps where cholera has not been for some time, perhaps remote from centers of infection, and where there is no history that will enable investigators to determine where the disease came from.

We could study a great many insects in this way, but it has been necessary, with limited force and limited time, to confine ourselves to rather narrow limits, and our work has therefore consisted in the study of flies as disseminators of hog cholera.

There are, I do not know how many, but hundreds of different species of flies in the United States, and these flies can be divided roughly for our purposes into blood-sucking flies, on the one hand, and non-blood-sucking flies, on the other. It has not been possible for us to study many species in either group; in fact, we have confined ourselves mainly to a study of the house-fly and the closely related lesser house fly, as representatives of the non-blood-sucking fly, which are unable to bite through the skin of an animal, and the stable fly, stomoxys calcitrans, as a representative of the class of biting flies.

We know, of course, that the house-fly is able to carry a great many different diseases. It may convey tubercle bacilli from tuberculous sputum, and what is particularly interesting in connection with our own work, the house-fly is believed to be an important channel for disseminating infectious ophthalmia in Egypt, a disease existing among the natives of Egypt.

It was conceivable to us that house-flies might become contaminated with the virus of hog cholera by feeding upon the excreta or upon the eye or nose secretions, which we know to be very virulent, and on the blood of sick pigs. The problem before us was to determine whether house-flies became contaminated with the virus in such a way, and if so, whether they were able, in fact, to transmit the infection thus picked up, to healthy pigs

It is a very common thing to see house-flies feeding around the eyes of sick pigs, so, knowing as we did that the eye and nose secretions are extremely infectious, our first experiments with house-flies were intended to determine whether flies which had fed and crawled over the eye secretions of sick pigs were capable of conveying the infection by merely feeding upon or

*Address by Dr. Marion Dorsett, chief of the Biological Division, Bureau of Animal Industry, U. S. Dept. of Agriculture, delivered at the 22nd annual meeting of the U. S. Live Stock Sanitary Association, Chicago, December, 1918.

crawling around or over the eyes of healthy pigs.

It would take entirely too long to attempt a description of the experiments in detail, and I, therefore, will merely summarize them. They are quite complicated, there are a good many facts which are, I think, really of importance, which I will not be able to touch upon at this time.

First, do house-flies become carriers of infection after coming in contact with the eye secretions of sick pigs?

House-flies and lesser house-flies captured at our stations were made to come in contact with the eyes of sick pigs, or with eye secretions which had been removed from the eyes of sick pigs, on cotton swabs. At different periods of time after the flies were exposed to infection by crawling over the eyes of the sick pigs, or over the eye secretions on swabs, they were ground up in a sterile salt solution and injected into susceptible pigs.

In the first experiment four pigs were each injected with one macerated house-fly which had fed on the eyes of sick pigs *thirty minutes* before all contracted hog cholera.

In the second test five pigs were each injected with one house-fly which had been held *one* and *one-quarter hours* after it had been in contact with the eye secretions of sick pigs. All of these pigs died of cholera following this injection.

The next four pigs were each injected with one macerated house-fly *four hours* after these flies had been in contact with the eye secretions of sick pigs. As a result of this, three died with typical lesions. The fourth was killed when moribund on the sixteenth day.

Five pigs were each injected with one house-fly, which had been held *twenty-four hours* after it had been in contact with the eye secretions of sick pigs. As a result, four pigs died of hog cholera and one remained well. In the last experiment of this series one pig was injected with one house-fly which was held *forty-eight hours* after it had been in contact with the eye secretions of sick pigs. This pig remained well after the injection, and later proved susceptible.

These experiments show that house-flies that come in contact with the eye secretions of sick pigs harbor the virus for at least twenty-four hours.

We next carried through a series of experiments with house-flies that had been allowed to feed on the blood of sick pigs.

Three house-flies were allowed to feed singly in tubes on the blood of sick pigs. One pig was injected with one of these flies *forty minutes* after it fed on the blood. A second pig was injected with one of these flies *twenty-four hours* after it fed on the blood, and a third pig was injected with one fly *forty-eight hours* after it fed on the blood. As a result all of the pigs died of cholera.

Next six house-flies were allowed to feed on the blood of a sick pig. Beginning two days after this feeding, one susceptible pig was injected each day with one of these flies ground up in salt solution. There were then, six pigs each injected with one fly, the flies having been held after feeding on the blood of the sick pig, two, three, four, five, six and seven days, respectively. All of these pigs promptly contracted hog cholera and died.

House-fly Harbors Virus

There seems to be no question but that house-flies which have fed on the blood of sick pigs, or on the eye secretions, harbor the virus for quite a considerable period of time thereafter.

Having thus ascertained that the house-fly may, for some days, harbor the virus of hog cholera, derived either from the eye secretions or the blood of sick pigs, it became necessary to determine whether the flies could transmit this disease to hogs. It was conceivable that the infection might be conveyed by the infected flies feeding on the eyes of healthy pigs, or on fresh cuts or wounds on the skin of healthy pigs.

At the beginning, before we had acquired very much facility in handling these flies and inducing them to feed when we wished them to feed, we had a good deal of trouble getting them to feed on the eyes of sick pigs and then to feed on the eyes of healthy pigs after the desired time had intervened. They were handled in tubes, and sometimes they would not come down from the tubes onto the eye of the pig, but would persist in staying in the upper part, and we thus had a good deal of trouble at the beginning. For that reason the experiments that were carried out in the very beginning were conducted in a more or less artificial way, because we were unable to get flies to do as we wished. The house-flies were grasped by the wings, with a pair of forceps, and were so held

that their legs and mouth-parts came in contact with the eye secretions of a sick pig, and they were then touched to the eye of a healthy pig in exactly the same way, the idea being to imitate, so far as possible, what took place or what might take place in nature.

These experiments may be summarized as follows: Eight groups of four pigs each, thirty-two pigs in all, were exposed to eight infected flies; one group of four pigs was exposed to one fly; another four to another fly, and so on, until eight groups of four pigs had each been exposed in the manner just described.

As a result of this, twenty-four of these pigs promptly contracted hog cholera and died. Four took the disease in a rather subacute form, and four remained well. The flies used in this experiment had been held only five minutes after being in contact with infected eyes, before they were used to expose these pigs.

In a second experiment four pigs were each exposed to a different infected fly four hours after the fly was infected. Three of these pigs contracted hog cholera and died. The fourth remained well and later proved susceptible.

In the last experiment in this series, one pig was exposed to an infected fly, twenty-four hours after the fly was infected. This pig also contracted hog cholera and died, making a total of thirty-seven pigs exposed, of which thirty-two contracted hog cholera.

These experiments show that hog cholera is very easily transmitted by transferring the eye secretions of sick pigs to the eyes of well pigs. We carried out a few experiments with nose secretions, and so far as they went the results were the same as with the eye secretions.

Following the work just described, we allowed house-flies and lesser house-flies to walk on or about the eyes of sick pigs in a natural way. They were imprisoned first in a tube, and then allowed to walk around the eye of a sick pig. The flies were transferred to clean tubes before being applied to the eyes of well pigs. Thirteen pigs were exposed to cholera by having flies, which were infected by walking around the eyes of sick pigs, walk around and feed upon their eyes. Most of the exposures were made within thirty minutes after the fly was infected with the eye secretions, though two were made following an interval of twenty-four hours. As a result of these exposures, five of the thirteen pigs contracted hog cholera and died. The remainder were found susceptible, when they were later injected with hog-cholera blood.

Conclusion

It seems fair to conclude, if we can draw any conclusion from a small series of experiments like this, that house-flies may convey hog cholera.

The next series of experiments was with house-flies, that were allowed to feed on the eye secretions of sick pigs. They were then allowed to feed on small wounds on the skin of healthy pigs. The experiments carried out were as follows:

Five healthy pigs were exposed by allowing flies which had fed naturally on the eyes of sick pigs, to feed on small artificial abrasions, or scratches on their ears. Three of the pigs were thus exposed one-half hour after the flies had fed on the eyes of the sick pigs, and two were exposed after an interval of four hours. As a result, of the three pigs that were exposed after thirty minutes, one contracted cholera and died with typical lesions. Of the two pigs exposed after four hours, both promptly sickened and died of cholera. Of five pigs exposed in this experiment, three contracted cholera.

In a second experiment, four pigs were exposed by allowing infected flies to feed on small artificial wounds as described above, but in this case the flies were first infected by feeding on the blood of a sick pig. Two of the four pigs exposed in this way contracted acute cholera and died with typical lesions. Therefore, of nine pigs exposed by allowing infected flies to feed on skin wounds, five contracted hog cholera.

The foregoing experiments seem to show that house-flies are capable of taking up and harboring the virus of cholera, and that under experimental conditions they transmitted the disease in a certain number of cases to healthy pigs. But the question still arises, do these house-flies actually tend, in nature, to spread hog cholera.

We have attempted to throw some light on this question by a series of experiments with screened pens. We had a number of screened pens built, fly-tight, and in each of these were placed one or two susceptible pigs. In all we had four separate experiments. Flies were caught daily in our virus barn with traps and nets, and im-

mediately after capture they were introduced through a special opening into the screened pens, with the healthy pigs. A large number of flies were thus introduced daily for twenty-four days, in two cases, and for thirty-one days in another.

All of these pigs remained perfectly well, and were later proved susceptible. Several thousand flies in all were introduced into each pen.

In two other experiments, a smaller number of flies were introduced into the pens, and they were for the most part flies caught when actually feeding on the eye secretions of sick pigs. In one of these, the result was entirely negative, and in the other the pig developed cholera twenty-five days after the first exposure to the flies, and six days after the last exposure to the flies. We do not lay a great deal of stress upon this one positive result. It may have resulted from the fly exposure, or perhaps from some other unexplained cause.

This, briefly, completes the series of experiments with the house-fly and lesser house-fly, and I wish now to refer to the experiments with the blood-sucking stable-fly.

Blood-sucking Stable-Fly

We realize, of course, that the results with this fly do not necessarily indicate what will happen with other blood-sucking flies. We selected the stable-fly, because it is found everywhere and is a voracious feeder on animals and is prevalent at a time corresponding very closely with the seasonal prevalence of hog cholera.

This fly is found in all parts of the world, and is very easily distinguished from the house-fly, for the proboscis of the stable-fly projects straight out in front of its head, and the wing pattern is also different.

The stable-fly is said to transmit surra and other animal diseases at times but it is not regarded as an important disseminator of these diseases. Their dissemination by stable-flies is believed to be by direct mechanical transmission.

We caught these stable-flies and allowed them to feed on sick pigs. The pigs were in various stages of the disease, and the flies after being held varying lengths of time after they had fed on the sick pigs, were ground with salt solution, and healthy pigs injected. All pigs injected in that way came down promptly with cholera and died. In two such tests, the flies were captured when biting sick pigs on two farms where hog cholera had broken out. The flies after being held twenty-four hours were injected into healthy pigs, and all produced hog cholera.

Results Varied

The next series of tests embraced our efforts to produce disease by the direct bite of stable-flies which had previously bitten pigs, sick with cholera. Considerable difficulty and uncertainty surrounds these tests. It was found difficult to induce the flies to bite when we desired them to. In addition, the results of the bites varied. In some cases when the flies bit a pig, they would draw blood; in other cases they drew no blood at all. We thought perhaps that the amount of infection that a fly would carry away on his proboscis mechanically would depend a good deal on how he happened to bite, whether he drew this drop of blood and thus perhaps carried considerable virus away.

These experiments may be summarized as follows: Sixteen different pigs were exposed to the bites of as many different lots of stable-flies, which had previously fed at different periods of time on sick pigs. The time that elapsed between the biting of the sick pigs and the biting of the well pigs, varied from five minutes to forty-eight hours. The sick pigs were in various stages of the disease. Some were on farms where a natural outbreak of cholera existed. The number of infectious stable-flies that bit each pig was in most cases but one or two, though three of the pigs were bitten by six, seven, and eight flies, respectively.

The results of this test were, that eleven of the sixteen pigs remained perfectly well, and were later proved to be susceptible to cholera. Four pigs died, showing typical lesions on autopsy, and one became sick, but recovered, and was later proved to be immune.

Of the pigs that developed hog cholera, two were each bitten by one fly one hour after it had fed on a sick pig; one was bitten by one fly, eighteen hours after it had bitten a sick pig; one was bitten by two flies eighteen hours after they had bitten a sick pig, and the last pig was bitten by three flies, twenty-four hours after they had bitten sick pigs.

We feel that special attention should be called to these results, because here apparently five out of sixteen pigs became in-

fected by the bites of these stable-flies, but a peculiar thing about these experiments was that the period of incubation of the disease in the pigs that contracted cholera was considerably longer than is customarily seen in hog cholera. The pigs that died showed the first symptoms on the 12th, 15th, 17th, 17th and 20th days, respectively.

Now, with that interval of time, there is a possibility, of course, of accidental infection, and we do not feel that we can positively exclude accidental infection in those cases. It is, however, possible that the period of incubation was lengthened, because the quantity of virus introduced was almost infinitesimal.

Experiments with Dead Flies

The next set of experiments with stable-flies, infected by biting pigs sick of cholera, was carried out by throwing dead, infected flies into pens with healthy pigs, and by putting such flies into the feed troughs, to see if they would thus convey hog cholera.

In the first experiment, one hundred and forty-six dead flies where thrown into a pen with two pigs, fifty one day, fifty another, and forty-six on another. Of these, twelve flies were dropped into the feed trough. One of the pigs sickened ten days after the first lot of flies was introduced into the pen, and the other, six days later, having perhaps contracted the disease from its pen mate. One died of cholera, the other became a chronic case.

The second experiment was the same as the preceding, except that only one hundred flies were thrown into the pen. The pigs in the second experiment both sickened on the seventh and eighth days respectively.

In a third experiment four pigs were each fed one infected stable-fly mashed up in their feed, and they all remained well.

In a fourth experiment five pigs were each fed six stable-flies which had recently fed on sick pigs. Three sickened after eating the infected flies, while two of them remained well.

We then carried out a series of screened pen experiments with stable-flies, similar to the experiments we carried out with the house-flies. The stable-fly does not bite well in closed pens or in shaded places. It bites best outside in the warmth and light. It retires to the shelter and the shade for rest. So we could do little with these flies in closed pens, but we built some pens about six feet square, boarded tight for about three feet from the floor, with wire gauze three feet above the boards, with a tight roof. We had special arrangements for feeding chutes on the sides.

We had one pen like this, in which we had sick pigs, and we caught stable-flies and put them in the pen daily, with the sick pigs, and they were seen to feed on the pigs. The flies in this sick pen were added to daily, and each day a number of flies were caught alive in this pen and introduced into similar pens with healthy pigs. We had seven such experiments. On an average, about fifty flies were introduced into each of these pens of healthy pigs daily. There were seven such pens, and the flies were introduced into each pen for seven days in some cases, and for nine days in others, though not longer than nine days in any case. They were, of course, liberated in these pens alive.

The results of these experiments were very different from those with the house-fly, because in five of the seven pens, the pigs came down very promptly with cholera. In the remaining two pens the pigs remained apparently healthy and when tested later seemed more resistant than the average to cholera. There is no doubt in our minds but that these pigs contracted cholera from the stable-flies. We do not know whether they sickened as the result of the bites of these flies, or by taking up the virus in some other way.

This completes the record of the experiments we have to present today. It seems to us that these experiments show that house-flies which have fed on the eye secretions or blood of sick pigs, may harbor the virus for some days at least, and that such infected house-flies may convey the disease to healthy pigs by feeding on their eyes, or on fresh wounds on their skin. On the other hand, the negative results of the screened pen experiments with house-flies, leads us to doubt whether the house-fly is an important channel for the conveyance of cholera from farm to farm, though the possibility of the disease being conveyed in that way is not, in our opinion, excluded.

With respect to the stable-flies, we believe that the experiments show perfectly clearly that these flies take up and harbor the virus of hog cholera, and that they may under favorable conditions convey hog cholera to healthy pigs.

It is interesting to recall that during the present fall, farms in the neighborhood of Ames, where hog cholera existed were

visited, and it was found that stable-flies were biting the ears of the sick pigs viciously. We saw very sick pigs with blood dripping from the tips of their ears as a result of bites of these flies. In one case there were so many of these stable-flies biting a sick pig, that one application of a small tube, only 1⅛ inches in diameter, to the ear of the sick pig resulted in the capture of twenty-five flies.

These stable-flies were also observed in considerable numbers biting pigs following cattle on farms in Iowa. Of course, there is a bare possibility that the virus of hog cholera goes through a cycle in the stable-fly, or some other fly. As to that we have done some work, but we have not gone far enough to make any announcement.

In concluding, it seems to us that, although the stable-fly may carry hog cholera it is not proven at all by these experiments. The results seem, however, to afford an additional argument for better sanitation upon the farm, and for the destruction of the breeding places of house-flies and stable-flies.

Microscopic Lesions of Mange*

By R. SIMON, Veterinaire 3rd Class, 1st D. A. Belgian Army

MANY publications have appeared on the symptoms, development, diagnosis and treatment of mange of the horse since the beginning of the war. Although these phases of the affection have been studied and are of interest there is no available description of the microscopic lesions of generalized and advanced cases.

It is known that the ova of the sarcoptes after being laid in a gallery of the epidermis develops into larvae. The larvae perforate the gallery, come to the surface and after several moultings become male or female sarcoptes. The male dies after copulation and the gravid female digs a new gallery, lays its ova and then also succumbs.

The parasite by a mechanical and toxic action irritates the tissues which react by

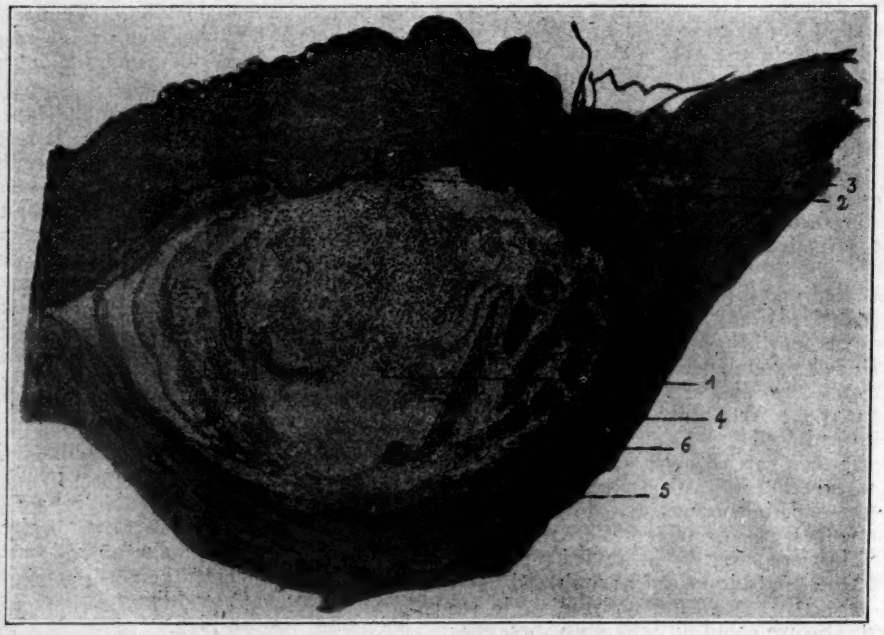

Fig. 1. Gallery into the epidermis: (1) Parasite, (2) its dorsal spines, (3) horny layer, (4) lower wall of the gallery, (5) stratum granulosum, (6) lymphocyte.

*Translated from the *Revue Generale de Medicine Veterinaire*, November 15, 1918, by Major L. A. Merrilat, U. S. A.

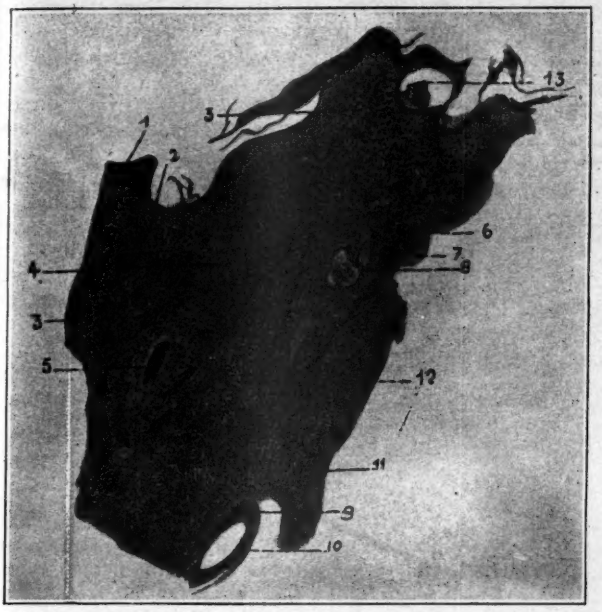

Fig. 2. Section following the long axis of a parasite follicle: (1) Horny layer of the epidermis, (2) mucous layer, (3) dermis, (4) normal hair follicle, (5) hair, (6) mucous layer of the parasitic follicle, (7) horny layer of the outer sheath, (8) parasite in the follicle, (9) transverse section of the follicle, (10) inner epithelial sheath, (11) sebaceous gland, (12) trails of embroyonic cells and leucocytes, (13) parasite in superficial location.

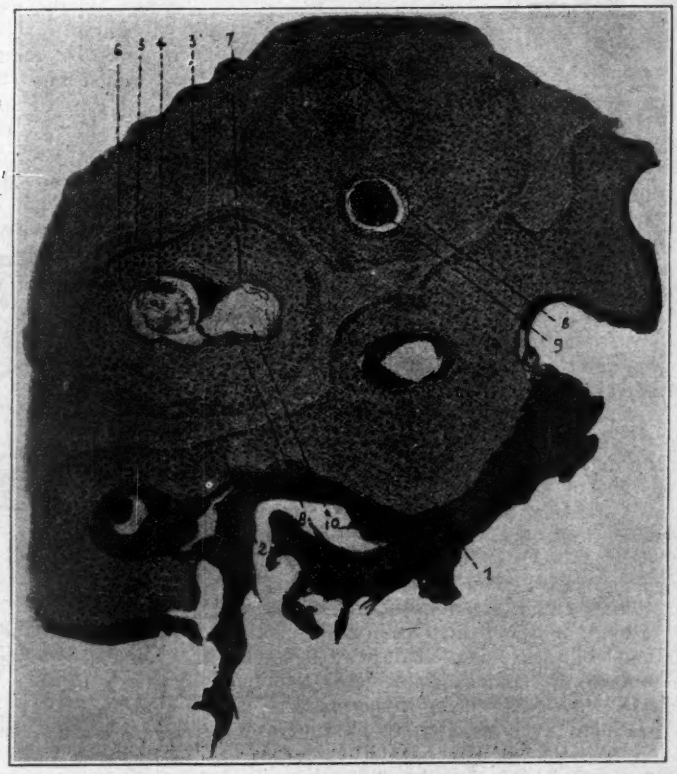

Fig. 3. Transverse section of a follicle with parasite: (1) Horny layer of the epidermis, (2) mucous layer, (3) dermis, (4) parasite, (5) fibrous sheath, (6) mucous layer of the outer epithelial sheath, (7) granular layer of the sheath, (8) horny layer of the same, (10) cavity of the follicle, (the hair has fallen out).

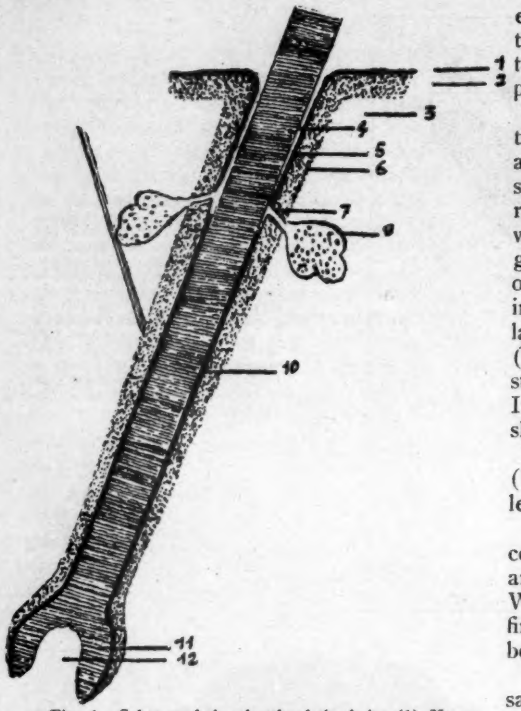

Fig. 4. Scheme of the sheath of the hair: (1) Horny layer of the epidermis, (2) mucous layer of the same, (3) dermis, (4) hair, (5) horny layer of the outer epithelial sheath, (6) mucous layer of the sheath, (7) Excretory canal, (8) sebaceous gland, (9) inner epithelial sheath, (10) hair-bulb, (11) hair-papillae.

the formation of the pimple known as the early and pathognomonic lesion of mange in the horse.

Inflammatory alterations take place in the two layers of the skin under the irritation caused by the abundance of parasites and the rubbing. These alterations are detected microscopically by the thickening of the skin, the formation of scabs and by the falling of the hair, etc.

It is necessary in fact to make use of the microscope to judge the nature and extent of the lesions.

A fragment of skin selected from the base of the neck from each of two horses affected with advanced and extensive mange was taken. After fixation with Bouin's fluid, sections were made and stained by the hematoxylin-eosin method. The following peculiarities were found:

Sarcoptic epidermis is thicker than normal, the layers being hyperplastic. The granular layer which is so difficult to see, on sections of the normal epidermis of the neck is found to be composed of several layers of cells. The three layers of the mucous malpighian layer are infiltrated with numerous mononuclear lymphocytes.

Sarcoptic galleries run in every direction in the horny layer and overlap one another in no definite order. They are stratified and limited by horny laminae of recent formation. The deepest galleries worm themselves between the horny and granular layers. Their outer walls are of variable thickness and their structure indicates that they belong to the former layer. The inner wall is remarkably thin (7-15 m.) and exhibits the structure and staining properties of the horny tissue. It is in direct contact with the spindle-shaped cells of the granular layer. (Fig. 1)

In addition to the ovigenous female (length 500 m., width 300 m.), the galleries contain:—

1. Ellipsoid ova (200 x 125 m.) The contents of the youngest ova is granular and is stained violet by hematoxylin. When older they show an embryo. The first laid ova are transparent and ruptured because of the escaped larvae.

2. Larvae. They stand out from adult sarcoptes by their morphologic character and dimensions (220 x 140 m.).

3. Heaps of spheric, granular brownish bodies (15 x 25 m.) with no affinity for stains.

In differentiating larvae from the ovigenous female it is necessary to rearrange these parasites by making serial sections.

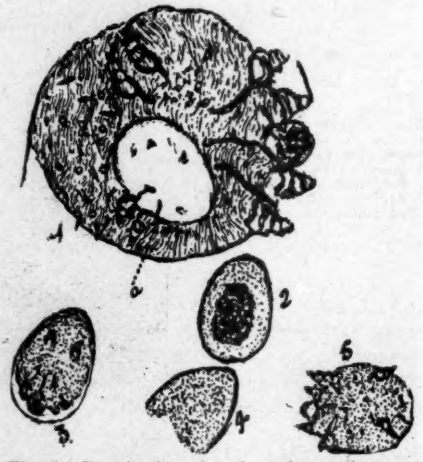

Fig. 5. Examination of exsiccated excretion treated with 40 p. 100 caustic potash: (1) Ovigenous female showing its ova duct (a), (2) newly laid ovum, (3) embryo in an ovum, (4) ovum of which the larva has escaped, (5) hexapodous larva.

The dermis as a whole is hypertrophic, the connective fasciculae are traversed by trails of embryonic cells and leucocytes. Superficial capillaries are dilated, the walls of the deep vessels are thickened and their caliber narrowed or obliterated.

Lesions in the follicle are as follows: The outer epithelial sheath of the hair follicle (which is but an extension of the epidermis) shows by continuity of tissue hyperplasia and leucocytic infiltration. Very often the parasite is to be found in numerous outer epithelial sheaths, but it is never found under the level of the orifice of the excretory canal of the sebaceous glands (Figs. 2 and 3).

The main characteristics of these lesions are: The parasite is located in the horny layers of the outer epithelial sheath. Its rostrum is pointed toward the hair bulb, although it remains molded by the cul-de-sac of the gallery. The spinal spines penetrate the wall of the gallery.

In short the parasite and its gallery show the same arrangement as in the epidermis. A few differences are to be noticed: (1) the thinness of the upper wall of the gallery, (2) the narrower diameter of the gallery and the uniform size of the parasite.

The continuity of tissue between the outer sheath of the hair and the epidermis accounts for the process of invasion of the follicle (Fig. 4) and the location and the orientation of the parasite in the sheath.

The parasite penetrates into the follicle by following the contour of the epidermis. Serial sections of the galleries show this process.

It might be asked why the parasite does not descend lower than the orifice of the excretory canal of the sebaceous glands. The reason seems to be that it does not progress when the outer epithelial sheath loses the character of the epidermis. It is known that the horny layer disappears at the level of this orifice, while the granular layer disappears but a little beneath it.

It remains also to be shown to what part of the evolutionary cycle the parasites found in the sheaths belong. Numerous examinations taught us they were larvae. The great difference between the size of the larva and that of the ovigenous female prevents any mistake. (Fig. 5) It follows, contrary to current opinion, that the larva instead of going directly to the surface in order to complete its development may go deeper into the skin and remain there for some time.

The conclusion is that sarcoptes scabiei does not live exclusively in the horny layers of the epidermis. Our observations show that in many instances the larva goes deeply into the outer sheath of the hair where it is protected from the action of drugs.

Veterinary Service at the Front

By DR. E. NICHOLAS, Veterinary Major of the First Class

Translated from the French by Major Wm. P. Hill, U. S. A.

THE veterinarian in service must show his initiative and activity. He must use his qualifications, which are triple: medical, hygienic, administrative.

Medical

1. ORDINARY MALADIES. Wounds of all sorts and certain other affections present themselves so often that it is important to remember the general line of their treatment which must be methodical.

Axiom: The blister is not a cure-all. Its advantages, however, when applied to a kick in a region where the bone is not protected by large muscles, must not cause the neglect of other methods which are indispensable. In other words, when we put on a blister, we have not done all.

(*a*) *Wounds of war and from harness.* When a wound suppurates abundantly, the suppuration is caused by a foreign body or a necrosis.

The wound must be sounded, the foreign body removed, the necrotic bone or fibrous tissue excised and drainage established. It is not necessary to follow with escharotics or tincture of iodin, etc. Cleanliness and a light protection of cotton suffices.

A wound which protrudes above the level of the skin leaves an ugly cicatrice, and caustics must be used to level it.

(*b*) *Wounds from kicks.* These injur-

ies do not always injure the entire surface of the skin; there is no old pus and no suppuration; it gets well if left alone; with rest, the lameness passes off.

When the wound suppurates, the pus is stringy; that is, the skin is injured over the entire surface and it is necessary to open it.

When the wound does not suppurate it is covered with a dry crust, but there is an extensive swelling and an acute lameness; there is a chance for not only the skin but also the aponeurosis under it being damaged. It is necessary to open it at the base.

In principle, all wounds from kicks around the joints demand absolute rest.

(*c*) *Lacerated wounds.* Bring together the points separated with silk stitches. Do not cut the hair or wash the wound—not even with antiseptics; do not touch it with anything whatsoever.

Touch above the sutures and hair lightly with tincture of iodine and cover with a light gauze dressing and bandage when possible. Healing by first intention is often the result if we carry out this procedure with precision.

(*d*) *Granulating wounds.* Exercise the granulations, curet the wound, cauterize with sulphat of copper or hot iron, or silver nitrate, or arsenious acid. Keep animal at work if practicable.

(*e*) *Nail wounds.* Remove the shoe at once, and having found the entrance point of the nail, trim down the sole well around to considerable thinness, then with a quick circular incision make a deep opening into the sole. The wound bleeds profusely. Cover with an antiseptic and clean cotton. Shoe with plate and padding to insure compression. The wound, which was dangerous because of its situation, is transformed at once into an ordinary wound.

When the horse is no longer lame, put a permanent pad on him and return him to duty.

If by chance the lameness persists three or four days, soak the foot in very hot baths. If the recovery is delayed, reexamine the wound and treat again.

A nail wound in the foot 99 times in 100 is thus cured; evacuation to the base being quite exceptional.

(*f*) *Cracked heels with necrotic areas.* Intense lameness soon accompanied by suppuration around the pastern, indicates necrosis. Use very hot baths. After elimination of the dead tissue, apply by bandaging an antiseptic paste, having as its base tincture of iodin.

Keep the animal immobile, if necrosis is severe, because of the danger of necrotic ligaments, cartilages or of arthritis. Avoid the large scars which at this point are frequent and dangerous.

(*g*) *Quittor.* All medical treatment is useless, especially escharotics. Evacuate to a hospital for immediate operation.

2. CONTAGIOUS MALADIES AND PARASITIC DISEASES. For preventing the extension of contagious maladies, the veterinary officer pays a sanitary visit to all organizations once a week. His attention must be particularly directed toward glanders, farcy and mange.

General measures to take in case of glanders:

When glanders has been found, the veterinary officers will take the following prophylactic measures:

(*a*) A sanitary inspection will be made at once. All horses or mules having a gland that is suspicious will be isolated at once.

(*b*) Mallein must be immediately obtained and all cases of clinical glanders destroyed. The Veterinary Director should be advised on the results of the reactions in sufficient time to enable him to render advice when necessary.

(*c*) After the decision on results, the healthy animals will be taken out of their stables and put on a picket line. Those which give a doubtful reaction will be isolated from the others. The animals which present characteristic reactions will be destroyed.

(*d*) The fumigation of the stables and the burning of all litter must be carried out. All stable equipment will be disinfected with a solution of 5% cresol. All the horses and mules will be watered at the same place if possible, during the time of the infection. Those which are not able to go to water will continue to drink in a bucket or tub reserved for their use; the disinfection of the latter will be the duty of the veterinary officer in charge, he allowing no access to them for twenty-four hours afterwards.

(*e*) The bridles, bits, halters, etc., are scrubbed and then soaked for fifteen minutes in a bath of cresol, and, after complete drying, returned for service. All

sponges that have been used around the diseased horses are destroyed.

(*f*) A placard with the inscription, "Glanders" is placed in evidence at all entries to the stable or cantonment infected, and is not to be taken down until fifteen days after the last case appeared, when the stables may be reoccupied.

(*g*) The postmortems must be performed in a place which is well isolated from the stables and water supply.

(*h*) All carcasses must be buried under a bed of earth not less than 1 meter and the plot fenced in.

(*i*) A solution of cresol will be put at the disposition of men who touch the glandered animals or attend the suspects.

(*j*) Twenty days later a second test is given to all animals.

3. TECHNIC FOR PALPEBRAL TEST:

(*a*) Syringe of 1 gram with graduate slide for tenths of a c. c.; a fine needle 10 m. m. long.

(*b*) Mallein: 1 to 4 for intradermal reaction.

(*c*) Dose: a tenth of a c. c.

(*d*) Injection: In the dermis of the lower eye-lid. Immobilise the horse by a twitch on the ear, seize between the thumb and the left finger a fold of skin about ½ an inch from the lower eye-lid. The right hand holding the syringe on which the screw-gauge has been regulated for a tenth of a c. c., take a position in such a way as to be able to follow the movements of the head. The needle is implanted horizontally intradermally, and not subcutaneously. This leaves a small sac or swelling on withdrawal of the needle.

(*e*) The reaction is absolutely local. Its maximum is produced between the 24th and 36th hour to the 48th at the most. When the test has been given in the morning, we wait till the next day for the appearance of results.

In the healthy animal, the eye conserves its normal appearance or presents a light insignificant edema.

In glanders, it produces a voluminous edema nearly closing the eye, the conjunctiva is injected, and the corner of the eye discharges a mucopurulent liquid. The incomplete reactions and the consequently doubtful ones are controlled 48 hours afterward by an injection in the opposite eye-lid.

(*f*) (A) Subjects not having reacted will be considered healthy and returned to their stables.

(B) Subjects presenting typical reaction will be killed without delay.

(C) Subjects considered doubtful will be isolated and held for further test, consisting of: (1) An injection in the other eye. (Since this report was written, the French are issuing a subcutaneous injection as the determining diagnosis.) (2) A second test 20 days later. (3) In case of doubt after this last injection, the suspect is killed.

4. EPIZOOTIC LYMPHANGITIS: This produces cords, abscesses and buttons following the skin lymphatics. It is curable but is contagious.

Measures to take:

1. Isolate affected and also suspicious cases.
2. Mallein.
3. Individual grooming equipment.
4. Institute a treatment if the lesions are localised:

(*a*) Open the buttons and the abscesses with the actual cautery, express the pus and introduce into each puncture a crystal of sulphate of copper proportionate to the size of the abscess, about the size of a pea.

(*b*) Envelope the infected region with an injection with a Pravaz syringe hypodermically 5 c. c. of the following solution: tincture of iodin, 2; water. 8.

(*c*) Sulphur ointment on the ulcers.

(*d*) If the disease offers a chronic resistance to treatment, destroy the animal.

(*e*) Thorough disinfection is very necessary.

5. SARCOPTIC MANGE: Horses that have bald spots and itchiness are not necessarily mangy. In winter the coat has a tendency to itch and depilitate locally, on the croup and inside the legs. Bites which are localized on the two sides of the neck, the depilitations which result are typical, the plaques of skin have an elongated appearance.

The little depilitations which penetrate the hair, the dimension of a bean or a 10-cent piece are not mange. A washing quickly puts an end to it. In case of doubt, isolate and treat for mange.

Symptoms of Sarcoptic Mange: Buttons, followed by small scabs, large bare spots without geometrical shape and spreading rapidly, itchiness and hardening of the skin,

appearing on the withers, the neck and head and invading the entire body.

Psoroptic Mange: This is limited to the mane and tail.

Chorioptic Mange: This is limited to the legs.

Measures to take in case of mange:

(*a*) Isolate and categorise the mange cases after hearing of the effects of treatment, those which are slightly affected, and easily cured, not being exposed to re-infection by the severe cases.

(*b*) Disinfect the grooming kits, blankets, etc., of the mangy horses in boiling water; wash and scrub leather equipment, dry the leather in the shade and return to service.

(*c*) Disinfect stables with whitewash and spread or sprinkle over the ground after removing the litter.

(*d*) Quarantine for fifteen days by a notice inscribed: "Mange" posted on all contaminated stables.

(*e*) In case of change of location, the chief veterinary officer will notify the officials of the town before leaving that these stables are not to be occupied for such time as he deems proper.

(*f*) Burn the hair produced by clipping.

(*g*) Stop all grooming of the sick until completely cured.

(*h*) Evacuate obstinate cases to a depot for mange.

Treatment of Mange

First day: Wash with black soap and rub vigorously with a wisp of straw to break up the hiding places of the parasites.

Second day: Wash with soap and water, then let dry.

Third day: Apply sulphur ointment rubbing in well.

Following days: Rub in more ointment daily. Stop when itching has disappeared. The return of the hair is a sign of cure.

A report is sent in to the Veterinary Director of all animals under treatment, suspected, and those evacuated. The report to be continued until ten days after the disappearance of the disease. Veterinary officers will always keep on hand a reserve supply of sulphur ointment of the following formula: Sulphur, 1 part; cosmoline, 3 parts.

Hygienic Role

The veterinary officer is responsible for everything that pertains to the hygiene of the horses. He takes the initiative in proposing to the commander all measures of amelioration practicable. In a word, in addition to caring for the sick, he must study questions of forage, drinking places, the best points in the vicinity to purchase supplies, the water supply in surrounding districts, also locations for stables and possible hospitals.

All the stables and sheds of the cantonment are used for sheds and lodgings for the horses. The sheds are transformed into as comfortable shelters as possible by the use of straw fencing (interwoven) placed so as to protect the animals from the prevailing winds.

Demountable and movable shelters may be secured from the engineer service.

In constructing makeshift or chance shelter, the walls, gable ends, slopes and depressions, roofing, straw-matting, sheet iron, tar paper, etc., may be secured from the engineer service. Broken stone and filling are placed on the pathways, roads and stalls, to provide dry standing places for the horses' feet and legs.

The shelters must be sufficiently deep to allow for a passage back of the horses. There must also be a dry space provided of sufficient size to store the forage, which must never be placed in the passage ways.

In case of movements, carry the demountable shelters which are light, the awnings, and in general all that which is not too heavy or too cumbersome.

Arrange the soil slightly slanting, the drainage slightly toward the rear, and make the ground solid with stones, broken stones, and crushed brick. Remove all clay.

From October until April, all horses without exception must be sheltered.

Bivouac. From the lines between two rows of caissons, the line is fixed to the wheel if for a short time, but is fixed by posts if the bivouac is to last some time, and should be under the cover of trees if possible to afford protection to the horses against the cold night air, and thus keep them in better condition. The line is changed from place to place when the soil becomes muddy. Gutters should be made if necessary.

Veterinary Infirmary. A stable or comfortable shed of about a dozen stalls is reserved for the seriously sick or badly wounded. and for cases of colic and pneumonia. The cantonments, shelters and

bivouacs must be kept in the highest state of cleanliness the litter being removed daily to a considerable distance from the camp.

Rations. In war the normal ration of oats will be issued by an order of the Commandant wherever the local resources permit of procuring supplies in necessary quantities. When it is necessary to feed the horses exclusively on oats on trains and convoys, the maximum ration is issued.

En route on trains, the ration for all horses and mules is composed of hay and two kilos of oats or barley. This, however, does not apply where the animals are on the train less than twenty-four hours.

At sea the uniform ration for all horses and mules is 5 kilos of hay and 2 kilos of oats or barley; 15 liters of water, this quantity of water being increased to 20 liters when the heat is excessive and to 30 liters while crossing tropical seas.

Oats must be fed from nose-bags or in wooden troughs or boxes. Horses must not be fed on the ground or on a sack.

The hay is given on the ground if the soil permits it; if not, branches are used to protect the hay from the mud.

Watering. This is a prime factor in the good treatment of horses. They must have water in abundance and be able to sink the head to the jaws. Without this, the water condition is not complete. The water must be from a spring, river, well, and from a pool only in case of absolute necessity. Water may be taken from the public watering places, from rivers, from fords, caught in wooden troughs or in barrels sawed in half.

Thin horses should be isolated so that they can eat all their ration without molestation. Divide the ration into a number of meals, the first given at a very early hour, the last late in the evening. Water four times a day. Keep them in warm stables and attend to their teeth.

Grooming plays a great part in the treatment of the horse and the prevention of diseases of the skin, especially mange. It is the only remedy against lice. Grooming is done outside when practicable. The brush of pigs' bristles is replaced in the saddle pockets on campaign by a dandy brush or dog-grass brush and a wisp of hay or straw.

Clipping is not permitted except under the order of a superior or in case of absolute necessity, mange and herpès excepted. The clipped hair must always be burnt.

The horses under treatment must have their tails closely clipped around the root.

Examination of meat and meat wagons. (*a*). A veterinary officer must always examine the slaughtered meat. The refrigerated meat must be examined immediately on delivery.

(*b*) The vehicles and utensils containing meat must be washed each day with plenty of water; after which, during warm weather, all are washed with Javel solution 1 to 20.

During the heated term the roofing or top of the wagon is covered with straw matting and fixed in place.

In periods of marching, the corps in charge of the rolling kitchens must cook as soon as possible the meat to be consumed for that evening and the next morning to arrest deterioration. These kitchens fill up again as soon as they are empty, that is to say the night or morning before departure.

Administrative Role

The evacuation of sick animals will be made to the hospitals when the trouble is found to be ordinary affections; to the mange hospitals if they are found to be mange or suspects of mange.

In principle, and if a large enough number of horses are ill, the depot is notified, if possible, by telegraph or telephone. In case of necessity, the horses are evacuated without previous notification.

It is necessary for each lot of horses evacuated, to issue a signed statement describing the motive for evacuation of each horse. This statement accompanies the horses and is given or sent to the depot. Horses incapable of rendering long service must be evacuated; i. e., mares in foal. (A rectal examination should be made to affirm the diagnosis.) The thin and emaciated horses must be given sufficient time to strengthen up before shipment.

The mange cases, horses with cartilaginous quittor, etc., etc., should be evacuated.

Horses too lame or too sick must not be evacuated if they seem unable to stand the fatigue of the trip.

When sick horses cannot follow the columns and are not in a fit state to be evacu-

ated, they are left behind in the care of farmers.

A statement must be made giving the corps to which the horse is attached, the condition of the horse, the motive and date of abandonment. A receipt for the horse is asked from the mayor of the town.

If the advance has not exceeded 15 kilometers, the veterinary officer must visit the horse frequently and return him to his corps as soon as possible, evacuate to a depot or destroy him.

If one cannot refer at once to the Commandant, the veterinary officer must take the responsibility of killing a horse when it is justifiable and economic.

All horses with glanders or with broken legs are killed without delay.

Monthly Reports

In his monthly report the veterinary officer gives the following information:

1. General condition of the horses, how many sick and measures taken to cure them.
2. Contagious diseases and parasitic cutaneous maladies.
3. Deaths. Precisely the nature of the disease or accident occasioning the death.
4. Evacuation. Nature of disease and cause for evacuation.
5. Forage; its quality and quantity per day; how much bought in the locality.
6. Conditions of watering facilities.
7. Propositions made during the month, by writing to the Commandant, in the interest of hygiene of the horses.
8. Requests and general propositions.

To the monthly report is added the report of autopsies.

The veterinary officers address their reports to the Director of the Veterinary Service of the Corps of the Army in the zone of their station.

Protecting a Ten-Billion-Dollar Industry

AT FIRST thought it may seem foolish to ask a man what he would do were he suddenly to come into possession of 75,000,000 hogs, 50,000,000 sheep, 69,000,000 cattle and 26,000,000 horses and mules, but perhaps it isn't. Uncle Sam, who is the most extensive up-to-date farmer in the world, owns that much live stock, and for good measure there is a large flock of poultry scratching round the place. Every man who is a stockholder in this concern may do well to try to put himself in fancy in the place of this wealthiest of stockmen who in this particular business alone is ten times a billionaire.

Well, what would you do? Count 'em? No, that doesn't look quite like the first job. The chances are that you would first make sure that the herds and flocks were reasonably safe from contagious diseases. In other words you would want some insurance—not insurance in the ordinary sense, but real protection that would actually prevent loss. The greater the live stock population the more necessary is a permanent plan of defense and capable men to carry it out. It is one of the first essentials of good business.

When the live stock industry of America developed to such an extent that outbreaks of disease became a serious menace to the welfare of the country steps were taken to reduce the danger. It was an outbreak of pleuro-pneumonia in cattle that was the direct cause of the establishment of the Bureau of Animal Industry. That Bureau now has many more duties, but preventing diseases from entering the country, checking the spread of those already here and protecting the public against products of diseased animals is a large part of the work and requires the services of 1,600 trained veterinarians. The class of work that these men perform may be judged by the requirements they must fulfill. At present all men entering a veterinary college must have had at least two years of high school training. Those entering next year must have three years, and thereafter no man may enter one of these schools if he has not had a full high school course of four years. The course at a veterinary college, as recognized by the American Veterinary Medical Association, the War Department, the U. S. Civil Service and the U. S. Bureau of Animal Industry, must extend through four years, nine months to the year, which puts graduates on a par with graduates of universities. Many of the men who occupy the more responsible positions were gradu-

ates of colleges and universities before taking up their special line of work.

Since 1884, when act of Congress established the Bureau of Animal Industry and Dr. D. E. Salmon was appointed chief, the American live stock industry has been protected from plagues of all sorts from without the borders of the country, and those already here are gradually being conquered. The most destructive diseases, such as foot and mouth and rinderpest, which exact an enormous toll every year in some foreign countries, have been prevented by this country's system of policing, from ever gaining more than a temporary hold on our farms. Rinderpest has never gained entrance. No thoughtful man can doubt that the establishment of this Bureau in the nick of time has prevented the cost of food production from being much higher than at present.

If hog cholera could be eliminated—and there is every reason to believe that it can be done—how much more efficient would be the farms of the great Corn Belt and those of other sections that are now larding the incomes of their owners.

A report of the United States Live Stock Sanitary Association estimates the average losses from cholera at $50,000,000 a year for the last forty years, which means that losses have been much greater in later years on account of the large increase in the number of swine. That annual loss represents 4 per cent interest on an investment of $1,250,000,000. In forty years the loss has amounted to $2,000,000,000, nearly twice as much as the theoretical investment.

In 1914 the swine industry paid a toll of $75,000,000 to this devastator of herds. But there is encouragement. The use of anti-hog-cholera serum, a preventive developed by the Bureau of Animal Industry, is increasing rapidly. The loss during the year ending March 31, 1918, is estimated to be $32,000.00, a reduction of 60 per cent in less than five years. In Iowa, the hog hub of the world, nearly 3,000,000 hogs died of cholera in 1913. In 1917 the loss was a little less than 189,000. In that state alone twenty Federal veterinarians are at work continually investigating outbreaks of cholera, establishing quarantine and applying sanitary measures for the control of the disease, encouraging the use of serum, and assisting in the reduction of cholera losses.

Some spigot economists look upon the expenditure of $500,000 annually to fight hog cholera as an extravagance, but when we consider that the smallest annual loss recorded was sixty times this amount it begins to look as if State and Federal authorities should not hesitate to ask for more funds and to pay large enough salaries to hold the experienced men.

The spectacular defeat of the cattle tick in the Southern States is a wonderful chapter in the history of the fight against live stock pests and plagues. The first appropriation for this work came in 1906 and now, twelve years later, nearly seventy per cent of the wide territory originally infected is free and ready for the development of a great live stock industry.

A Bureau of Animal Industry official made the all-important discovery that Texas fever was caused by an organism transmitted by the cattle tick. Another Bureau officer worked out the life history of this insect, enabling others of his profession to develop practical methods of eradication. With very few exceptions veterinarians have directed the work of eradication right down to the individual farm. But they have not dared to estimate what the results mean in real money to the South and in food for the whole country. They are too conservative for that. But even a real estate promoter would hardly be apt to put the figure too high.

One of the most widespread and costly diseases of domestic animals is tuberculosis. The cattle and swine industries suffer enormously year after year. The president of the Chicago Live Stock Exchange recently estimated that the loss every twelve months is equal to seventy trainloads of live stock of forty cars each, mostly hogs. Men in the Bureau of Animal Industry estimate that the country loses $40,000,000 every year as a result of this slow-moving but persistent plague. For years but small progress was made toward getting it under control, but during the past year the accredited herd system has been applied nationally by the Bureau of Animal Industry in cooperation with the state live stock sanitary authorities and the United States Live Stock Sanitary Association. The fight is now being waged on the principle that eradication of tuberculosis is an economic question. Money has been appropriated by Congress for the purpose of partly reimbursing owners of cattle whose

animals have been slaughtered in the campaign for clean herds. Herds that come up to the requirements receive a certificate of approval from the Bureau. Cooperative work has already been started in forty states. After one year of work under the new plan 289 breeders have had their herds accredited. More than 1,400 herds have passed the first test. There are 3,320 grade herds and 867 herds of pure breds under supervision being prepared for the test. Altogether there are about 6,000 herds under supervision, a fair indication that the system finally devised is making a strong appeal to cattle owners. As more states arrange to take advantage of Federal assistance it will be necessary for Congress to appropriate more money to help reimburse owners for animals that must be slaughtered and to employ the necessary experts.

Of all the activities of the Government veterinarians that of meat inspection is probably best known to the public. This work will continue to be of vast importance so long as disease is so widespread among our farm animals. The food supply must be protected from diseased or otherwise undesirable meat. The great scope of this work of protecting the consumer's meat supply is evident when we consider that inspection is maintained at about 850 plants and that every year nearly 60,000,000 animals are given both the ante-mortem and post-mortem examinations. The information obtained by the inspectors is not only useful in protecting the food supply, but it provides the most conclusive argument for increased work and expenditures in eradicating animal diseases. What we can afford to pay to eradicate them any man can figure out for himself when he knows that practically a quarter million carcasses are condemned every year as unfit for human foood.

The battle against the outbreak of foot and mouth disease in 1914 is still fresh in the memories of stockmen. It cost the country millions of dollars to kill the infection, but as a result our herds are free from this destructive scourge. Several outbreaks have been stopped in the past and no one knows how many have been prevented from entering the country by our quarantine service. Right at this time there is an outbreak in England, but it is not probable that one droplet of the virus will get by our quarantine.

At one time scabies of sheep and cattle levied a big tax on the industry, but the parasite causing this disease is now pretty well under control. Millions of animals are inspected each year and several millions are dipped. Dourine, a dangerous disease of horses in large areas of the West is being brought under control rapidly and the prospects are that it will soon be eliminated except on some of the Indian reservations where work is exceedingly difficult. Contagious abortion, which probably causes an even greater monetary loss among cattle than tuberculosis is not yet well understood, but scientists of the Bureau are continually making investigations and tests with a view toward developing an immunizing agent or finding means for preventing infection.

This brief review of the work that has been done or is being done to protect the live stock industry of America can give only a meager idea of the complexity of the job that is before our Government veterinarians who act as police and secret service, one might say, who guard our cattle, horses, hogs and sheep from alien enemies. To weaken this force would seem like an economic crime, but it is being weakened to a dangerous extent. For the last four or five years the Bureau of Animal Industry has been losing many of its very best men. They have gone into private biological laboratories, to serum producing plants, they have taken up ranching or have gone into other commercial enterprises. The exodus has not been caused so much by the lure of the dollar as by the unceasing pressure of the cost of food, clothing and house rent. And when an old friend, a practitioner, says he is making as much in a month as he could make in a year if he were "working for the government" some man is apt to wonder whether he is doing the right thing by his family, and finally concludes that he isn't.

But are we going to let a ten-billion-dollar industry run along without insurance?

State Laws and Serum Production

By Edward M. Boddington, Kansas City
Attorney for the Associated Serum Companies of America

ANTI-HOG-CHOLERA serum and virus is produced by State licensed and Federal licensed serum plants. The State licensed serum plants cannot legally ship their products interstate, and such serum and virus must of necessity be sold and consumed within the state where manufactured. Prior to the passage of the Virus-Serum Toxin Act (37 Statutes, 872) by Congress, state plants carried on an interstate business; however, since July 1st, 1913, the date when said Act became effective, only Federal licensed serum plants are permitted to sell and ship anti-hog-cholera serum and virus interstate. There are about as many peculiar regulations as there are states, and it would be impossible to harmonize the extremes of state regulations of the serum industry in a paper of this length.

Serum plants holding a Federal license are supervised by the United States Department of Agriculture, Bureau of Animal Industry. The B. A. I. has a corps of government inspectors, trained and skilled veterinarians, who oversee the manufacture and production of anti-hog-cholera serum and virus in every plant licensed by the Federal Government. The regulations under which the United States licensed plants operate, guarantee the production of a high standard serum and virus.

All serum and virus produced under U. S. license and released for market has been prepared and tested in accordance with the provisions of the regulations of the B. A. I., and when thus prepared, tested, and marked "it is not worthless, contaminated, dangerous, or harmful." Although Congress, by the Constitution of the United States, has been delegated the power of regulating interstate commerce, several of the states have endeavored to infringe upon the business of the U. S. licensed serum plants by prohibiting, in a round-about way, the legitimate business of said companies, by passing certain arbitrary, unreasonable, and useless bonding laws, testing laws, and laws which would brand serum and virus produced beyond the limits of said state as inherently dangerous.

The main purpose of state legislation has been to foster the production of the state plant, or rather the serum plant within the confines of the state, desiring a monopoly upon the serum and sales industry, has used the state legislation to good advantage. Such legislation has not in any sense protected the real party interested; that is, the hog-raiser. Regardless of such state legislation, all plants operating under a U. S. license have the right to sell and ship anti-hog-cholera serum and virus interstate.

However, the large volume of sales in the serum business is conducted by local distributors and veterinarians in the various states, and some state laws ultimately prohibit distributors and veterinarians from conducting a legitimate business and selling a product which has been branded by the United States Department of Agriculture as not "worthless, contaminated, dangerous, or harmful," but as a scientific preventive of hog cholera. For instance, Nebraska has a bonding law supposedly for the benefit and protection of the hog-raiser, but in effect it operates only as a means for an insurance company to collect a premium from any and all serum companies doing business within the state of Nebraska. As a result some U. S. licensed serum producers conduct no business in Nebraska, and in case of an outbreak of hog cholera, owing to the present status of the Nebraska law, many serum companies would not ship serum and virus into Nebraska, and the hog-raiser would pay the penalty for such a law in the loss of many of his hogs.

The specific bonding laws of Nebraska require serum producers to put up a five thousand dollar bond and five dollars cash for doing business in the state each year. The Iowa law requires a one thousand dollar bond and twenty-five dollars cash. The Kentucky law requires a five thousand dollar bond and fifty dollars cash. These laws succeed in keeping serum and virus, which has passed Government inspection, out of these states at times when it is badly needed to prevent hog cholera. The hog-raisers of Kentucky, during the summer of 1918, experienced a need because of the ravages of hog cholera, for serum and virus, and the serum producers would not supply the

Kentucky demands because of said exorbitant bonding requirements.

The farmer is erroneously led to believe that these bonds are for the purpose of protecting him against any loss from the use of any particular brand of serum upon his hogs. However, each of said laws provides that the Secretary of Agriculture, or the chairman of the Agriculture Committee, or the state veterinarian, shall receive any penalty arising on the bond, so the state and not the farmer receives the cash for the breach of any bond, and there is not a case on record in which any U. S. licensed serum plant has been required to forfeit its bond.

The question of serum and virus has only been presented to the Supreme Courts of three states, and each time when presented the serum companies operating under a U. S. license have not been legally compelled to pay for the loss of hogs from vaccination. Serum and virus prepared in a U. S. licensed establishment is made and tested in the most scientific manner, under strict government supervision. There is no arbitrary law which can fix the potency of serum of the vilulencey of virus, since the specific organism causing hog cholera has not been isolated. The scientific mind knows hog cholera only from circumstantial evidence; likewise the effect that this particular medium has upon a hog is all the scientific world has to place its judgment upon. However, when serum and virus are produced according to government regulations, under government supervision, and after passing the government test, their qualities are proved beyond a reasonable doubt, and the hog-raiser is in this manner protected in the highest degree.

Hog cholera serum is not a curative but a preventive, as was said in a well-known Missouri case (199 S. W. 582). The Missouri Court said, "The mere fact that hogs died from the use of hog cholera virus and serum in the way it was intended to be used, does not establish negligence in its manufacture." The laity has been erroneously led to believe that anti-hog-cholera serum and virus is a protection from all the diseases that swine are heir to, but neither the Department of Agriculture, nor the trained veterinarian in the United States, has ever claimed such qualities for serum and virus. A majority of the "breaks" in swine and deaths after vaccination are due to other causes; such as, pneumonia, necrobacillus, swine plague, and mixed infection. The cause of hogs dying after proper vaccination with U. S. licensed serum is, in 99 per cent of the cases, attributable to the various other diseases to which hogs are susceptible. Some loss from inoculation is caused by the hog-raiser vaccinating his own herd. The farmer's protection lies in securing serum that is produced under Federal supervision.

Indiana passed a law prohibiting the use of serum and virus made in plants within a radius of 4,000 feet of the public stockyards; in other words, after measuring the distance of the serum plants in Omaha, Nebraska, Sioux City, Iowa, and Kansas City from the public stockyards, this law passed in an endeavor to monopolize all of the serum and virus business within the state of Indiana for the local producers of serum and virus. Tennessee provides the 800-foot distance. For what scientific reason should a serum plant be 4,000 feet in one instance from a public stockyards, and 800 feet in another instance? It is a striking example of the extremes that state legislatures will go to in endeavoring to protect home industries, without regard to the true welfare of the veterinarian, the hog-raiser, and the farmer. It is arbitrary and unreasonable legislation.

The marketable supply of hogs today is largely contingent upon the use of good serum and virus. The matter of state legislation is of little importance since the government has so ably provided ways and means of preparing and testing a standardized product. What study or research does a member of a state legislature give this problem? Do they face it from a scientific standpoint, or from a personal standpoint? We can only conclude that the state legislatures, without regard to the welfare of the farmer, the veterinarian, and the hog-raiser, have in the past erred in legislation; have kept good serum and virus out of states which needed it badly, and have in reality diminished the marketable supply of hogs.

It is understood that Indiana proposes to prohibit foreign-made virus from the state. This is another attempted regulation of interstate commerce by the state, and in reality would prohibit the local distributor from handling virus made outside the state. This is an evident attempt to monopolize the

(*Continued on page* 102)

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The B. A. I. Classification Bill

EVERY veterinarian is directly interested in the rider to the agricultural appropriation bill providing for increased pay for veterinary inspectors in the employ of the Bureau of Animal Industry. Not only is this bill granting increased pay a simple act of justice to the veterinarians in the Bureau, but it will be of direct benefit to every other veterinarian, whether practitioner, state, or municipal employe.

The Bureau of Animal Industry is by far the largest employer of veterinarians in the world, having more than 1,600 veterinarians in its employ, and in a large measure fixes the salaries of all veterinarians in public employ. Cities in enacting ordinances providing for veterinary inspectors are influenced in the matter of salary fixing by the salary given federal inspectors. Deputy state veterinarians and assistant state veterinarians, employed on a per diem basis, and instructors in veterinary colleges, all receive salaries based to a greater or less extent upon the salaries that the Bureau of Animal Industry pays to its veterinary inspectors.

The interest of practitioners in increased salaries for the Bureau of Animal Industry veterinarians is not so direct, but is nevertheless potent. Veterinary practitioners serve the public no less than veterinarians in the employ of municipal, state or federal governments, and they are paid by the public, as are the salaried men, the difference being that the amount of pay is a matter of private rather than of public agreement. But the public has its say as to what the amount shall be.

Perhaps it should not be so, perhaps it will not always be so, but it cannot be denied at the present time that the public judges the worth of a profession, an official, or an individual in no small degree by the remuneration he receives. Other things being anywhere near equal, the higher the salary of a public official, the higher he is rated by the public, and the higher veterinarians in public work are rated, the higher practitioners in general practice will be rated. This greater appreciation of the veterinarian in public work is, aside from and in addition to, another advantage that the practitioner will derive from higher pay for veterinarians in the Bureau of Animal Industry and for veterinarians in all state or municipal work. Higher pay for these places will result in a better class of veterinarians engaging in such work and this, of course, will redound very materially to the credit of the veterinary profession. At present it is very difficult to retain good men at the salary paid by the federal government, or by the states and municipalities, and unless there is a prompt and material increase in such salaries, many of the best men now in these positions will be lost to them through resignation. Through the failure of able veterinarians to apply for such positions, a further loss will accrue to public veterinary work.

We hear much about higher entrance requirements for veterinary colleges, and better courses of instruction in veterinary colleges as a means of improving the veterinary profession. These measures are

good as far as they go and are necessary, but perhaps at the very bottom—the most essential prerequisite for the advancement of the profession is greater remuneration for its constituents. Better salaries for federal, state and municipal employes, and higher fees for veterinary practitioners will naturally result in attracting a better class of students to the veterinary colleges.

The veterinarians in the Bureau of Animal Industry have little political influence. Many of them are moved about so frequently as to be practically disfranchised. The others are largely congregated in cities where they have little opportunity for wielding political influence through an appeal to the constituents of any considerable number of congressmen. The veterinary practitioner is situated most fortunately in this respect. No other man in this community, other than a professional politician, can so easily and certainly influence voters on matters in which he is interested. The practitioner's work brings him constantly into intimate and confidential contact with the farmers of his community and with other live stock owners. Every politician who appeals to the farmers for votes realizes this potent influence of the veterinarian; hence most of them are constantly seeking the support of veterinarians.

Realizing this, the Bureau of Animal Industry veterinarians have planned to appeal to the practitioners for support for their classification bill. This appeal will probably come soon. We urge every practitioner to look upon the enactment of this classification bill as a matter in which he is personally and vitally interested; to support it now in every way that he can and when he is called upon, to act with a promptness and energy that will count. The time is ripe for its enactment; Congress will pass it if the veterinary practitioners of the country want it bad enough to do their best for it. Otherwise it will not pass.

Elsewhere in this issue, we publish a short article designed to refresh the memory of practitioners upon the importance of the work of the Bureau of Animal Industry veterinarians and to furnish them with arguments to be used upon their representatives in Congress and the men of political influence in their communities. Read it carefully; make it your own; and prepare to use it.

DR. HENRY A. GREER

December 27, Dr. H. A. Greer died at his home in Danville, Illinois, of an inflammation of the meninges, possibly a sequel to an attack of influenza from which he had suffered some weeks previous.

With Dr. Greer's death, the veterinary profession of Illinois lost one of its most distinguished, able and generally liked members, who had endeared himself to his clients and to others of his community to a degree that is seldom attained.

Dr. Greer was one of the young men in the profession in his state, being but thirty-eight years of age. His veterinary practice in Danville was one of the largest in the state or elsewhere. No citizen of his community was more highly respected or more ready to lend his influence or to give his time for anything and everything that meant the betterment of the community.

Dr. Greer's professional ability was of a high order. His affable personality, his genius for making friends, his absolute honesty had already received signal recognition from the veterinary profession of his state, he having served the state veterinary association as vice-president and during the past year, the most prosperous in its history, as its president. As president of the association, he displayed unusual initiative and energy in his efforts for its welfare.

The funeral was held from his home at Danville. It was attended by great numbers of Dr. Greer's former friends, including veterinarians from almost every section of the state. Among the veterinarians present were:

A. T. Peters, Peoria; T. J. Foster, Monticello; F. J. Pilon, Champaign; I. S. Alford, Paxton; W. B. Holmes, Springfield; D. M. Campbell, Chicago; Wm. Stratman, Danville; F. A. Shepherd, Fairmont; A. W. Smith, Farmer City; R. E. Nesbitt, Clinton; W. J. Martin, Kankakee; J. T. Nattress, Delevan, J. C. Stewart, Danville; H. S. Springer, Indianapolis, Ind.

Dr. Greer was a thirty-second degree mason and the funeral services were conducted by the Masonic Lodge of Danville. He is survived by a widow and two sons, aged 8 and 10.

WATCH FOR GLANDERS

The United States Department of Agriculture has issued regulations prohibiting the return of army horses from Europe on account of the possibility of such horses bringing into the country some diseases that are not present here now. This is a wise provision and one necessary for the security of the animal industry of the country.

It is also desirable that a keen lookout be kept for glanders or other contagious diseases among animals that are being sold at the various army remount camps. Glanders was present at many, perhaps all of the remount depots at some time during the past year and a half. Disastrous outbreaks were prevented only by constant watchfulness and repeated malleinization. So serious is the menace of this disease in military camps that instructions from headquarters issued to camp and unit veterinarians just before the armistice was signed contained the following:

This office is again forced to draw the attention of all depot and unit veterinarians to the importance of the task before them in the eradication of glanders. This is by all means the most serious problem which confronts the Veterinary Corps today. The results thus far obtained are not satisfactory and the importance of constant and unremitting attention in the application of every detail of the various instructions on the subject of glanders is again emphasized.

No animals should be allowed to remain untested for a long period. It is no excuse for not testing to state that there was no reason for suspecting infection. The veterinarian is wholly responsible for advising when tests should be made and no veterinarian is justified in regarding his station free from glanders unless he can prove such to be the case by records of frequently repeated tests. The presence of the disease will always be suspected in the absence of evidence to the contrary.

Every assistance in this work has been promised by the Remount Division and will be afforded by this office and failure to discover cases promptly by means of frequent tests will be considered a direct reflection on the efficiency of the responsible veterinarian.

It would be too much to hope that no incipient case, no "carrier" or non-clinical, chronic case of glanders will get by the inspectors and carry this disease to horses of the civilian population as a result of these sales. The state veterinary officials are alert to their danger, but the recognition of this disease and other diseases that may be spread by the horse demobilization must in the main rest with local practitioners. It will not be a bad plan for practitioners to advise their clients to have all the horses, among which army horses have been introduced, given the mallein test in thirty to sixty days.

Army Veterinary Corps Miscellany

FEW discharges of veterinary officers have occurred during the month. other than those announced last month as soon to occur. Several veterinary officers have returned from oversease and have been discharged, or will be soon.

Last month some consideration was given to matters of dissatisfaction and discontent that has existed among officers and men of the veterinary corps in the United States. We have been requested rather pointedly to tell of these same matters as they exist overseas. All who have read our "Army Veterinary Corps Miscellany" regularly, know that all has not gone well with the veterinary corps overseas. They know that but few veterinary officers have received promotions after proceeding to France; they know that for long months when organization was imperatively needed there was none and the veterinary corps was under the quartermaster's department as in the old regular army before the war; they know that, as individuals, officers of the veterinary corps have made splendid records and achieved results it was believed would require superhuman effort to accomplish, but that as a corps it has not been permitted to function as it should.

Now that the actual fighting is over there is more time for squabbling, and the veterinarians are availing themselves of a long delayed opportunity to kick about things that are not as they should like to see them. There is no end to the dissatisfaction and complaint. In view of the many conflicting and even chaotic reports, it is not safe to arrive at any conclusions as yet. Judgment as to whose is the fault if blunders have been made, and predictions as to the future of the veterinary profession in the military establishment must be withheld.

However, as a matter of information

and an indication of the trend of veterinary affairs, it may be stated that Col. D. S. White is again chief veterinarian of the A. E. F. For a time the chief veterinarian in France, like the director of veterinary service at Washington, was not a veterinarian but was a lieutenant-colonel of cavalry, who succeeded Col. White after he (Col. White) had held the position only about three weeks. After a struggle during which it appeared for a time that the veterinary corps might be sadly worsted Col. White won and has again been placed at the head of the veterinary corps of the A. E. P. An effort was made to put cavalry officers in as chief veterinarians for each of the armies, i. e., for the first army, the second army and the third army, into which American Expeditionary Forces were divided, but on the first attempt the chief veterinarian of that particular army demanded a "show down," and that stopped the whole proceeding and veterinarians are still supreme in the veterinary matters in the armies as they are again in the A. E. F. As in other branches in the military service, regular army officers are supplanting the emergency army officers in the veterinary corps; that is, the veterinarians who were in the army before the war, are being placed in the more important positions in all the armies and in the base hospitals, supplanting leading men in the veterinary profession who went into the army since the war began, and who were wanted and retained in positions of great responsibility while there was serious work to do and principles to establish.

The plan of the army quartermaster corps for January is to sell an average of 10,000 horses a week, which will mean a gradual decrease in the veterinary corps.

At the auction sales of army horses announced last month, the animals brought fair prices, in most cases between $75 and $200, on the average, considerably less than the purchase price but perhaps as much as could be expected.

Total Animals at Each Camp.

The total number of animals sold at each of the camps, forts, and remount depots, was as follows: Devens, 2,600; Meade, 1,300; Greene, 1,050; Charleston, 530; Gordon, 566; Fort Sheridan, 1,121; Pike, 2,400; Travis, 1,000; Cody, 1,300; Sherman, 1,488; Funston, 1,514; Dix, 1,100; Newport News, 1,250; Wadsworth, 675; Jackson, 1,023; Wheeler, 1,200; Shelby, 2,214; Logan, 1,518; Bowie, 1,500; Fort Bliss, 1,200; Grant, 1,050; Dodge, 1,296; Sevier, 957; Upton, 1,100; Lee, 600; Hancock, 1,280; Johnston, 1,000; McClellan, 1,025; Beauregard, 1,500; MacArthur, 785; Doniphan, 1,200; Taylor, 1,484; Custer, 1.128; Western Department, 3,500.

Horse demobilization is a rather more difficult problem for Great Britain than the United States. Seventeen per cent of the horses in England were exported for army purposes, and the demands of agriculture are such that many of them must be returned, notwithstanding the danger of importing disease in this way. The Belgian government has already purchased 50,000 horses from the British army, and it expected that France will take a similar number. Most of the remaining horses in Western Europe that are serviceable when the army's need for them is over will be eventually returned to Great Britain and sold at public auction.

Field Marshall Sir Douglas Haig has acknowledged the services of horse power in the war as follows:

"If in March, 1918, the equine force of Germany had been on the same scale, and as efficient, as the British equine force, the Germans would unquestionably have succeeded in breaking through between the French and British armies, and inflicted a defeat so great that recovery might have been impossible."

In the last four months of 1914 the British armies in France lost 12 per cent of their horses, or about 3 per cent per month, during a period that included the retreat from Mons, the battle of the Marne and the first battle of Ypres.

During the last ten months of the war they lost only 2½ per cent, despite some very heavy fighting.

In commercial firms in England there is generally about 20 per cent of their horses sick or resting, but the veterinary returns showed that with the British army in France the highest percentage of the sick and resting was 12½ per cent. The army produced an unexampled veterinary service.

The demobilization of animals in the eastern theaters will give rise to discussion. They are something like 100,000 horses and mules belonging to the British armies in Egypt and Mesopotamia.

Lieut. H. O. Weilepp, a graduate of the Chicago Veterinary College, who was located at Cisco, Ill., before enlisting with the veterinary reserve corps, died in Nice, France, December 7, 1918, of pneumonia following influenza. Dr. Weilepp was a member of the Illinois Veterinary Medical Association, and was well liked by all who knew him. He was unmarried.

Dr. C. H. Newman, of Union Grove, Wis., died in the overseas service in September. We were unable to secure any of the details.

Dr. Edward N. Nettleton of Los Angeles, Cal., who has been stationed at Camp Jackson, S. C., since last fall, has received an honorable discharge from military service. Dr. Nettleton is one of "the old boys" who showed that he could come back. For nearly twenty years the Doctor had a thriving practice in Chicago but on account of his wife's health, he gave up his practice some four years ago and removed to Los Angeles, where under his own vine and fig tree he was enjoying the reward of long, hard work, when the war broke out. He volunteered his services to the veterinary corps and was commissioned a 2nd Lieutenant. He attended the Medical Officers' Training Camp at Camp Greenleaf.

Maj. Cotton, general veterinary inspector at Ft. Worth, Tex., has been discharged from the service in order to enter on his new work as state veterinarian of Minnesota. His place will be taken, at least for the present, by Maj. Walter R. Pick.

Maj. Turner, general veterinary inspector for the eastern division, has been discharged from the Walter Reed Hospital, Washington, where he has been ill.

PROMOTIONS AND ASSIGNMENTS

Maj. C. W. Greenlee has been ordered to Charleston, S. C.

Capt. H. E. Egan has been directed to report to the commanding general of the southeastern department for discharge.

Capt. J. L. Ruble has been ordered to Ft. Bliss.

The above pictures show Lieut. Elmer J. Bryan, of the Veterinary Corps, formerly in practice at Owatonna, Minn., and his saddle horse, Prince, standing "Retreat." Picture No. 1 shows Prince following the command "Parade-Rest" just before the last call for lowering the flag. In No. 2, "Salute," Prince is saluting the flag while it is being lowered, in his own way, the same as the Lieutenant. These pictures were taken at Auxiliary Remount Depot No. 333, Camp Joseph E. Johnston, Jacksonville, Fla., where Lieut. Bryan has been stationed for the past seven months. Captain Black, in command of the camp, has been credited with the statement that Lieut. Bryan was the best horseman that he had ever seen. As the pictures show, the Lieutenant carries no whip, which is a further demonstration of his ability as a master and trainer. Prince has qualified as a soldier and testifies his devotion to the flag daily by saluting, which, by the way, is only one of the many stunts which this remarkable horse performs.

First Lieut. C. O. Grace has been ordered to Columbus, N. M., for duty with the 12th Cavalry; First Lieut. E. H. Lenheim to Laredo, Tex.; First Lieut. F. C. Segelken to Chicago; and First Lieut. E. E. Hobson to Fort Leavenworth.

To be majors: Capts. R. M. Buffington, G. G. Miller, G. H. Koon, J. W. Burby, D. B. Palmer, O. P. Davis and F. B. Lunn.

To be captains: First Lieutenants B. R. Thayer, R. P. McComb, W. C. Pulsifer, R. H. Schreckengost, G. R. Browne, L. P. Koster, G. L. Campbell, R. M. Hampton, J. J. Roberts, J. L. Lindsey, T. J. Quinn, G. T. Reaugh, D. S. Robertson, H. B. Roshon, B. C. Smith, J. S. Spikes, E. Temple, J. R. Underwood, H. C. Bestal, A. C. Wight, F. L. Younglove, G. M. S. Zinkham, C. W. Likely, H. B. Balthasar, L. B. Blackburn, R. I. Cheely, H. Clark, W. M. Decker, G. L. Fallon, J. J. Essex, P. T. Gillie, G. W. Grim, H. H. Haigh, F. E. Jones, W. C. Keck, R. E. Kyner, E. J. Laing, C. J. McAnulty, R. B. McCord, H. C. McKim, N. S. Nutty, and J. P. Porch.

First Lieut. O. E. Gladfelter to Ft. Bliss, with Mobile Vet. Sec. 15-2; 2nd Lieut. G. E. Anderson to Jeffersonville, Ind., Wagon Co. No. 301; Lieut. C. H. Cleland to Aberdeen, Md., Proving Ground; 1st Lieut. F. C. Meissner to Stithton, Ky., Camp Knox for duty; 1st Lieuts. C. O. Petry and C. O. Williams to West Point, Ky.

Veterinarians Return to Civil Life

Capt. Robert Cofeen, formerly in command at Camp Taylor, has been discharged and has returned to his home, Stillwater, Minn.

Dr. Z. L. Williams, who has been the Unit Veterinarian for the Reclamation Dept. Co. No. 1 at Camp Jackson, S. C., has been honorably discharged, and has returned to his old home in Cleveland, Wis., where he will resume his practice.

Dr. J. Ralph Snow, Camp Greene, will practice at Central Square, Oswego, N. Y.

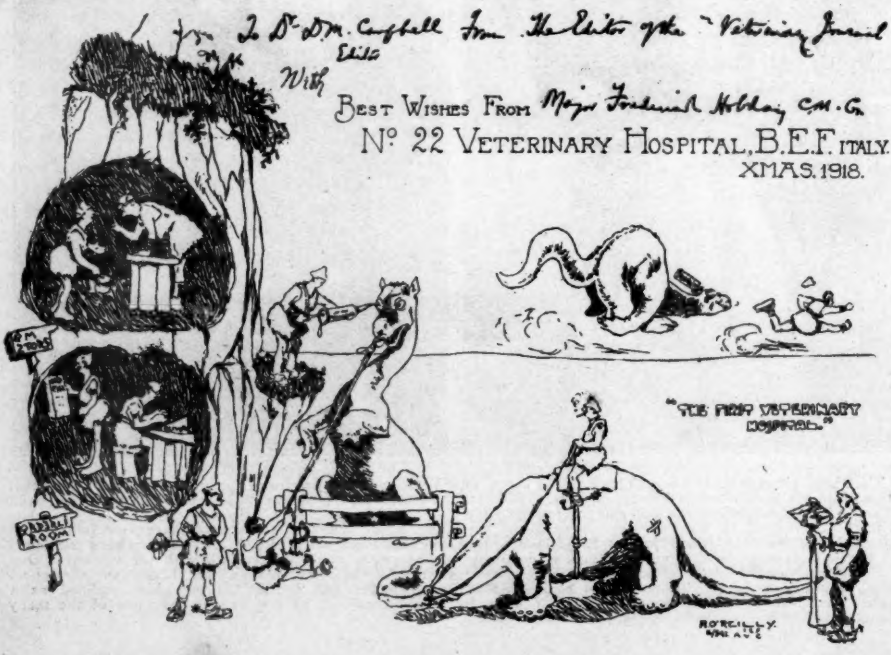
Dr. Alvin Letson has returned to his practice at Fountain, Mich.

Dr. Ralph West, Ft. Oglethorpe, is contemplating a location at Waseca, Minn.

Dr. O. I. Catlin, Camp Greenleaf, has returned to Barnesville, Minn.

Lieut. Edmund Mackey, Camp Greenleaf, formerly of Mandan, N. D., has gone with his wife to New Orleans to spend the winter.

Dr. D. L. Cotton, Camp Greenleaf, has resumed his practice at Beresford, S. D.


To Dr. D. M. Campbell
From the Editor of the "Veterinary Journal"
With
Best Wishes From Major Frederick Hobday C.M.G.
No 22 Veterinary Hospital, B.E.F. Italy.
XMAS. 1918.
"THE FIRST VETERINARY HOSPITAL"
SADDLE ROOM

Lieut. T. M. Rossing, Camp Joseph E. Johnson, will resume practice at Milaca, Minn.

Dr. A. J. Currie, who has been released from service, will locate at Park Falls, Wis.

Lieut. J. E. Wentworth will resume practice at Rochester, Minn.

Dr. M. D. Henley, Camp Greenleaf, will locate at Hillsboro, Ind.

Dr. Francis Reid, Camp Greenleaf, has returned to St. Joseph, Mo.

Dr. J. C. Thompson will resume practice at Pomeroy, Wash.

Dr. G. W. Barden, Camp Greenleaf, has returned to his practice at Hammond, Ind.

Dr. W. J. Walsh, Camp Greenleaf, will establish offices at Creston, Ia.

Dr. George Gordon has resumed practice at Gibson, Ill.

Dr. A. C. Spannaus, Camp Greenleaf, will resume practice at Waconia, Minn.

Dr. A. L. Seng, Camp Greenleaf, has resumed practice at Roberts, Ill.

Dr. Ray Gilliam has resumed his practice at Fairfield, Ia.

Dr. W. W. Webb, who was recently discharged with the rank of captain, has opened offices at Opelika, Ala.

Dr. Chester Miller, discharged, has purchased the practice of Dr. John Montgomery at Anamosa, Ia.

Dr. H. D. Shrewsbury, Camp Wadsworth, S. C., has formed a partnership with Dr. W. C. Shikles, at Plattsburg, Mo., the organization being under the firm name of Shilkes & Shrewsbury.

Dr. O. H. Graham, former state veterinarian of N. C., has been discharged from service and will locate at Tarboro, N. C.

ANOTHER ENVIABLE FAMILY RECORD

Since the publication in a former issue of the rather remarkable record made by Captain George A. Jarman and his three sons in the service, we have had information from several sources as to the equally patriotic service which has been rendered to the nation by Lieut. J. F. A. Bateman, of the veterinary corps stationed at Camp Jackson, who has just been granted an honorable discharge, and has returned to his home at San Diego, Cal.

Lieut. Bateman, who is English by birth, is a graduate of the San Francisco Veterinary College, and has been a resident of California for more than twenty years, engaged in veterinary practice. He attended the Medical Officers' Training Camp at Camp Greenleaf, last summer and was one of the most popular men of Co. 45.

Besides giving his own services, Lieut. Bateman has three sons in the service, all in field artillery overseas. The eldest son, Ronald, has been overseas since last June with the Sixth Artillery, and has taken part in a number of big battles. The next son, Eric, has also been in France since last June with the One Hundred and Eighth Field Artillery. The youngest son, Gurth, has been in France since July with the One Hundred and Forty-Third Artillery.

Lieutenant Bateman was also attached to an artillery company, but much to his regret was not given an opportunity to go across. At any rate the Bateman family will have no embarrassment in explaining "where they were during the war." Their exceptional record of patriotism and national service is one they may justly be proud of.

This picture, one of the mementos gathered by Mr. Brenner on his Eastern trip, is of interest from several standpoints. From the feminine viewpoint, the millinery display would, of course, be of greatest interest. It is, however, of historic interest, having been taken at Atlantic City, N. J., in 1908, following the organization of the A. V. A., now in a flourishing condition and known as the Ladies' Auxiliary of the American Veterinary Medical Association, and these are the charter members: Mesdames James Ross, Frank K. Nice, Harry B. Cox, Chas. Dingley, Alexander Glass, W. Horace Hoskins, Miss Rose, Mrs. Clarence J. Marshall.

BOOK REVIEWS

The Anatomy of the Domestic Fowl

By B. F. Kaupp, M. S., D. V. S.
Poultry Investigator and Pathologist, Experiment Station, State Department of Agriculure, and the State College of Agriculture. Pages, 373. Published by the W. B. Saunders Company, Philadelphia, Cloth, $3.00.

Because of the advanced work in the study of poultry husbandry among the two-score and more agricultural colleges and experiment stations as well as among practitioners, now being extensively carried on in this country, a demand has arisen for a textbook on the anatomy of the domestic fowl.

To meet this demand, Doctor Kaupp has produced this book which is the first and only complete and authoritative work on the subject.

Doctor Kaupp's work as poultry investigator and pathologist in the North Carolina Experiment Station and his work in connection with the publishing of several other books on poultry culture, have given him exceptional opportunities to gather information on the subject at first hand. This work suplemented by extensive research work, representing much time and effort, furnish the basis for the text.

Throughout the book, the subject is treated in a most systematic, scientific, yet withal practical manner.

For convenience the discussion is grouped under the following headings: Anthology, Myology, Splanchnology, Angiology, Neurology, Esthesiology and Embryology. These subjects are still further subdivided to facilitate easy reference.

After a general discussion of osseus structure, the skeleton of the fowl is dealt with exhaustively. The remarkable rapidity of ossification in the fowl is noted, also that other parts of the bodies of adult birds also become ossified, i. e., the tendons of the muscles of the legs, the feet and of the neck, the plates of the corneal margin of the sclerotic tunic of the eye, the stapes of the ear, even ossification of the attachments of the semi-lunar valves of the aorta and of the pulmonary having been reported by Owen.

Another interesting point in the anatomy of the fowl is the air reservoirs contained in the body of the bird to make flying easy, these spaces being provided with small transverse osseus columns crossing in different directions from side to side.

Under anthrology are discussed movements of the joints, and the ligamentous structure of the various parts of the fowl's anatomy, the illustrations being especially helpful in locating the various ligaments and tendons.

In the chapter on myology, it is noted that the fowl is equipped with 162 muscles, the bird being provided with a system of delicate dermal muscles divided into numerous fasiculi, which act upon the feather quills and collectively agitate the plumage.

Under splanchnology is discussed the digestive apparatus: the mouth, tongue, pharynx, glands, esophagus, crop, stomach, proventriculus, gizzard, intestines, etc., and the accessory organs of digestion as well.

The chapter on the respiratory apparatus is well handled. Owen is quoted as saying: "Notwithstanding the extent and activities of the respiratory function in birds, the organs subservient thereto manifest more of a reptilian than of the mammalian type of formation."

The chapter on angiology contains a minute description of the circulatory apparatus, supplemented by numerous illustrations, some of which are in colors.

The discussion of the nervous system of the fowl, which occupies some thirty-nine pages of the text comprises one of the most interesting chapters in the book.

The chapters on structures of the appendages and embryology of the chick are followed by the concluding one—Outline for Laboratory Study of the Chick: (1) the living embryo, (2) the entire embryo, (3) study of the embryo by dissection, (4) study of the serial sections with the compound microscope.

A bibliography is appended, citing all literature of any import bearing on the subject.

Doctor Kaupp is to be congratulated on the thoroughness and directness of purpose with which he has handled this rather intricate subject. We predict that this work will long be regarded as a masterpiece in the study of the fowl, and it will go far toward placing poultry culture among the sciences, and emphasizing the necessity of a knowledge of the fowl's anatomy by the country practitioner in districts where fine-bred fowls are raised.

DEPARTMENT OF

BOVINE PRACTICE

Edited by JOHN FRANCIS DE VINE, D. V. S.

Rearing the Calf

IT is largely a matter of opinion at what point to attack this subject so as to lead smoothly to the discussion of bovine diseases, but perhaps as good a place as any would be to start with the calf, and even then not at the time of its birth but rather at the time of conception.

To hold interest in the care of the calf, we of course will need to confine our discussion to pure-breds only, since in most localities where intensive dairying is practiced, the scrub calf is fortunate if it escapes the butcher's hands for one short week after birth.

Calf-raising is no mean art and far from being an unimportant one, since I question if with the present high overhead charges of maintaining a pure-bred dairy, if there are many breeders of the dairy type, be they ever so enthusiastic, who could withstand the financial strain if the profits were to come solely from the pail. Consequently it is rather noticeable of late at dairy breeders' meetings, let the topics on the program be what they may, when the calf question is touched on, what great interest is suddenly manifested.

Raising a pure-bred calf is a different proposition from raising a hardy grade or scrub, and we could add that it takes better calf-breeding to raise a pure-bred of the Channel Island breeds than one of our larger and hardier breeds.

The methods that have been instituted by our pure-bred breeders to make great records and so popularize the breed and make good reading advertisement have been carried on with rather a pointed disregard for the constitutional vitality of the dam or her offspring. In fact it is not exaggerating to say that in some breeds it is not an uncommon thing for a breeder to pamper and care for a cow with absolute disregard for her milking period or yearly production, so long as she can make a great seven- or thirty-day record. The same rule holds good in the dumb animal kingdom as with mankind. When you deviate from Nature's course you do so at the expense of some part of the animal economy. Persist in this and you will transmit a heritage with as reasonable a certainty as you will other hereditary traits or characteristics, and so as years go on and the raising of pure-bred stock becomes more intensive, our troubles and difficulties multiply in direct ratio, unless we can and do, in a measure, offset these troubles by applying both scientific and practical knowledge born of experience.

Barrenness and weak calves are not entirely associated with contagious maladies, but are many times the result of bad, and what might be termed unnatural practices.

In the first place I am of the opinion that a cow that has milked ten or eleven months and milked well, has served her master well, and is entitled to two months' rest, with of course good care during the rest period.

Further, I am of the opinion that everything being equal, the generative organs not being diseased, you will have a higher percentage of breeders in a herd where animals are bred the third or fourth month after freshening, than you will in herds that are bred later, and surely if there is any limitation to the number of ova that may ripen during an animal's lifetime, the animal will breed longer, when bred oftener.

Another factor that is perhaps of equal importance, is what might be termed the artificial method of housing our dairy animals and the lack of sufficient exercise in the open air. Perfect ventilation, the thermometer registering so and so, is all very well and we all are agreed that it makes more milk, but in clear weather unless it be on days unusually cold, a sheltered

yard and the heavens for a canopy at least part of the day, will make stronger lungs and grow more hair on the dam's back and produce more stamina in the calf's belly than a feather bed and a furnace.

This is the first step in the growing of stronger calves and the slogan should be "More Nature makes a stronger calf."

There is also another principle that is now widely recognized by pure-bred breeders and that is the fallacy that the straw stack is plenty good enough for the dry cow. The day when the helpless pregnant cow had to drain every ounce of flesh off her body during the last six weeks or two months of pregnancy in order to nourish the unborn calf, while she herself, from lack of nutrition, became almost unable to lie down or get up, is fast disappearing.

It is now pretty generally agreed that the last two months of development of the calf exacts the severest strain on the dam's system of any two months of her pregnant period, and in order that she may properly nourish the fetus in-utero and maintain a physical condition such as to make her a profitable producer when her calf is dropped, she requires during the latter period of pregnancy about as liberal a proportion of a balanced ration as when producing her medium milk flow; in fact, with some individuals it is the only period when flesh that has been "milked off" can be restored, and should be restored, on such animals, by a liberal percentage of corn in their ration. Calves of dams fed and cared for in this way and dropped in a herd free from contagion, are quite sure to be strong calves, and strong calves of any breed thrive almost in spite of us; therefore, there can be no set rule that can be applied under the caption of "Caring for the Calf."

Those who are blest by the absence of tuberculosis and the venereal diseases and allied ailments should really be ashamed to complain of the minor dietetic disorders which are so easily controlled by diligently applying cleanliness and exactness in the time and amount of feeding, and underfeeding rather than overfeeding until the calf is at least two months old. To overfeed a calf that has been properly brought up to the age of two months is in most instances, nothing less than lack of intelligence or interest.

There are certain principles, however, that will apply to every calf and if strictly adhered to are often of the greatest aid to the veterinarian in either preventing or cleaning up digestive troubles in a newborn calf, other than infections or white scours. (This subject is of such importance as to warrant a separate article.)

The principles referred to are:

1. Regular feeding. It is just as important to feed a calf regularly to have it do well as it is to milk its dam regularly to have her do well.

2. The milk must always be fed at approximately the same temperature. If it cannot always be warm then it should always be cold. As a matter of fact, however, it is only rarely that a valid excuse can be given for the feeding of cold milk to young calves, since the simple addition of a little hot water solves the problem.

3. Absolute and scrupulous cleanliness of the utensils and reasonable cleanliness of the calf's surroundings. The calf pail should receive the same cleansing and sterilization that the milk pail receives.

4. Underfeeding rather than overfeeding. This is an indefinite statement and can be qualified only by saying that a calf should receive enough milk at a feeding to sustain it in good dairy flesh but not veal fat. A calf that does not go to the bottom of the pail and look for the last drop has had just a little too much, but it should have sufficient so that its flanks show that it has been fed and that it will not be blatting and worrying during the intervals between feedings.

5. Calves should have clean quarters and a large run so they can take plenty of exercise. Calves that are not born in the severest of weather should have a yard with a southern exposure and the freedom of it at all times, with well bedded quarters to go to when they care to. All calves will do better if fed whole milk for at least two months or longer if the owner can afford it.

I have argued at stock breeders' meetings for at least fifteen years that no calf can get as good a start on artificial feeds or skim milk the early part of its life, as it can if given whole milk. Some experienced, hard-headed breeders have argued with me that while calves do not look as well they do just as well, but I could never see it that way and now we know it is not so, because scientists, notably Prof. McCollum, have proved rather conclusively that it is the butterfat or cream in the milk

that contains the *growth-promoting elements so necessary for youth.*

Some of the simpler digestive troubles that may be occasioned by failure to observe the rules we have mentioned above are usually manifest by bowel disturbance, constipation or diarrhea, capricious appetite, unthrifty appearance, and if not corrected in a few days there is apt to be more or less bloating, the calf lying in a corner listless and stupid. This form of indigestion is ordinarily not violently manifested and may usually be corrected rather promptly by removing the cause and withholding all food for from twelve to twenty-four hours (unless prostration is so great as to warrant giving milk as a vehicle for such stimulants as aromatic spirits of ammonia, whiskey, alcohol, capsicum, etc.) and giving an oleaginous cathartic, two to eight ounces, depending on the size and age of the calf, to which has been added either formalin or a reliable coal-tar product, followed by stomachics and sulphocarbolates, every two to four hours, depending upon the severity of the symptoms, and if the case warrants it this treatment may be supplemented by stimulants. Usually at the end of twenty-four hours small quantities of boiled milk may be allowed three times a day. The increase of quantity and the return to raw milk will need to be determined by the individual case.

In my next article I will discuss acute indigestion in calves and the advantages of diluting the milk of the Channel Island breeds as a preventive.

SYMPTOMS INDICATE ESOPHAGEAL TROUBLE

I would like some information as to the diagnosis and treatment of the following case:

A red Poll milk cow, seven or eight years old, kept in a corral and fed alfalfa hay. Condition seems good and milk supply is up to the normal amount. Appetite seems good, but when rumination begins a large amount of green liquid and some of the regurgitated hay is dropped with each lot that comes up. She seems to chew only about half as long as she should.

I have given a tonic treatment, nux-gentian, but so far seemingly without benefit. She has been affected in this way for two months.—A. M. B., Colo.

REPLY BY DR. DE VINE: If you have eliminated all trouble with the buccal cavity and fauces, such as new-growths, foreign body, split tooth, sharp teeth, injured alveoli, etc., I would strongly suspect esophageal trouble, which would include esophagitis, esophagismus (spasm of the esophagus), mild obstruction of the esophagus, mild stenosis or narrowing of the esophagus, and plasms in or pressing on the esophagus.

The diagnosis and differentiation of these different ailments is not always simple and usually requires the reviewing of the literature on the subject and a careful observation of the case in hand.

DILATION OF CERVIX AND DRAINAGE INDICATED

I am writing in the hope of getting a little light on some cases which have been giving me some trouble recently.

On June 16, I was called to see a grade Holstein cow, aged 8, which had calved a month previous and had been in good health previous to parturition. The owner stated that shortly after calving, he noted that the cow was not doing well. The abdomen kept gradually getting larger on both sides until it was so enormous that the cow could walk only with great difficulty. Palpation showed the abdomen filled with fluid. Rectal examination diclosed a tumor-like body against the right wall of the abdomen. I diagnosed a cystic condition of the right horn of the uterus, with ascites. Upon tapping the cyst on the right side with a large trocar, approximately ten gallons of fluid escaped, but the size of the abdomen was not immediately diminished. I told the owner the case was hopeless, and the cow died a short time afterward. Post-mortem examination disclosed the right horn of the uterus and also the abdomen filled with yellow fluid. Was there no treatment that I could have given the cow to relieve this condition? If so, I would be glad to hear of it.—J. A. B., Ia.

REPLY BY DR. DE VINE: Since you make no comment relative to the other organs in the abdominal cavity I take it that all of them are normal. I also take it that in puncturing the uterus it was through the abdominal wall into the horn, which probably afforded a way for the fluid you found in the abdominal cavity to get there; in other words, the pathological condition seemed to be confined to the right horn of the uterus and the fluid was serous and not purulent, therefore it would

seem highly probable that if you had dilated the cervix and drained the uterus and then cleansed the endometrium by repeated irrigation with an astringent, and established permanent drainage for a few days, if necessary, by stitching a piece of tubing fast to the cervix, that you could have either totally relieved the condition or relieved it sufficiently to beef the animal. Iodid of potash in full doses would probably have been of material advantage in supplementing the surgical treatment. For statistics it would be interesting if you would state whether or not there was any evidence of the uterine condition being a sequel of dropsy of the uterine walls that existed during pregnancy, and was unobserved at the time of parturition. This is technically termed parietal hydrometra, but is rather rare in domestic animals.

Queries and Answers

NOTHING GAINED BY FEUDS

As a subscriber to your Journal, I should like to ask for a little advice. A veterinarian in a neighboring town has been trying to run me out for a number of years. Now he is trying a new stunt. I have just learned that he is calling me a pro-German, which is more than I can swallow. I tried to enlist but was rejected on account of physical disability and have the papers to show for it. I have also bought Liberty Bonds. What course would you advise me to pursue in the matter?—F. J. L.

REPLY: I do not believe that anything is gained by keeping up a strife between veterinarians.

If every time your competitor knocks you, his auditor replies, "Well, Dr. B'ank always speaks well of you" it will "flabbergast" him sooner or later, and then his goat will be yours. It is hard to follow this line of action, and you may be inclined to retort in kind, but it will not get you anywhere to continue the strife.

As secretary of a state association, not infrequently I receive from members some such complaint as yours. I usually write the offending member a conciliatory letter and ask him his side of the squabble. We usually get things squared away without bringing the matter before the association—that is, just among ourselves. If you are a member of your state veterinary association and you have a secretary who is so disposed, it might be well to utilize his services as peacemaker.

I should not be concerned, if I were you, about the pro-German charge. People make up their own minds on matters such as this, and your attitude is doubtless known to an extent that slanders can have no effect. I should assume such to be the case and should not deign to reply to such a charge. There is a good deal of sense in the old saying: "No lady or gentleman will insult me. No other person can."

AZOTURIA ACCOMPANIED BY ANURIA

What would be your procedure in a case of azoturia where there was no urine obtainable after passing the catheter? No urine could be drawn after the patient became ill. The patient went down and is still down. The catheter was in the bladder and was in good shape.—H. T. C., Ill.

REPLY:—Regarding treatment in a case of azoturia accompanied by anuria, it is quite generally believed that the kidneys are one of the most important emunctories in cases of azoturia and that vigorous action from them is helpful. Therefore, I would certainly give such an animal copious intraperitoneal injections of normal salt solution; I judge that up to ten gallons of this might be used. I should also give it full and frequent doses of potassium citrate orally, and I would, of course, give lobelin, hypodermically, in sufficient quantity to keep the patient quiet.

As in all cases of downers, the animal will need to be turned at the very least eight times in every twenty-four hours and to be kept on very heavy bedding, which must be kept dry at all times. Where it is expected that recumbency will be continued for several days, portions of the body liable to decubital necrosis should receive frequent applications of alcohol, in which a small quantity of tannic acid has been dissolved.

In other words, your case should receive the usual treatment for azoturia, with the addition of treatment for the suspended secretion of urine, for which there are many treatments, but I would regard copious intraperitoneal injections with normal saline solution as harmless and effective. In this condition I should consider the use of digitalis or turpentine contraindi-

cated. They might not do harm or they might be very harmful, and no one can tell in advance of their trial.

GUNSHOT WOUND IN SHOULDER

On October 31st I was called to see a black mare with a large swelling on the shoulder. The humerus and radius were also swollen quite badly and there was a small opening running up into the joint from which a little blood was oozing. I bathed the shoulder with warm water for about an hour, which reduced the swelling somewhat. After washing the shoulder with bichlorid solution, I injected a weak solution of iodin well up into the wound, and then made an examination. I found a small hole extending into the shoulder-joint quite deeply. I diagnosed it as bullet hole, and left bichlorid and iodin with instructions as to their use. (I discovered that a neighbor had shot another horse in the neighborhood and had threatened to shoot my client's horse, which he had evidently done.) On calling two days later, I found the swelling all gone; the shoulder down to normal; horse not able to move; hole discharging pus (not joint oil). I worked the joint well; gave an injection of iodin and ether and made an examination well up into the joint. I took out a piece of split bone about the size of a large bean and some other bone slivers and cleaned out the wound as well as I could, and left drugs and instructions with the owner.

The horse has not been improving and when I called last week I found the joint in bad shape, the shoulder swollen and the hole into the joint still quite large. I am satisfied that it is a bullet wound, but have been unable to find any bullet, despite the fact that I cleaned out the abscess that formed, well up into the shoulder. I put on one of Abbott's green blisters, and the owner told me today that the horse was coming along fine and was able to walk. I would be glad if you could give me any suggestions as to treatment of cases like this, as I have been unable to find much about joint wounds in books on lameness.—R. J. W., Sask.

REPLY: I do not believe that any improvement on the treatment you have administered can be suggested, unless possibly it would be to enlarge the opening to permit freer drainage, but I presume it is in the prognosis that you are most interested. It is decidedly bad in a case of this kind providing, as I understand to be the case, the joint has been opened. It is more than likely that the synovial surface will be denuded, or that the articular cartilages will be ossified and incurable lameness result.

A CASE FOR LABORATORY DIAGNOSIS

I have recently had an experience with hogs that has been very interesting to me.

They start as though they had bad colds, sneeze, cough and become somewhat emaciated. The cough becomes very hoarse and croupy. A large percentage get well but some choke to death and some few develop pneumonia.

On postmortem I find a tough, greyish membrane in the upper part of the trachea, filling the trachea in some cases, while in others it comes loose and in the expiration of air is projected into the trachea and sometimes into the epiglottis, causing death.

I have lost two fat hogs from the latter cause and one with pneumonia. I have intended to get a smear from the throats for microscopical work, but have not as yet done so.—S. C. P., Ind.

REPLY: The cases described may be due to some chemical irritant that produces a croupous inflammation of the anterior respiratory tract, but the chances are that it is due to some microbial invader which produces the croupous inflammation. Of the microbial agents capable of producing such a disturbance, there is the streptococcus and possibly also the B. pyocyaneus and the B. necrophorous.

It would be advisable to obtain a definite diagnosis by sending a specimen to some reliable laboratory and then you would know better how to proceed.

OVERFED AND UNDEREXERCISED

I have been presented with a bulldog, formerly the pet of a lady. He is a little over a year old, and has been fed without regard to his digestion. When he drinks much water he immediately vomits, as he also does if given a little fat meat. He is extremely fat and I have been trying to shorten his allowance. As I am a country practitioner and have had very little dog practice, any advice you can give me will be gratefully received.—W. I. H., Ont.

REPLY:—Conditions such as you describe are by no means uncommon in dogs that have been overfed and underexercised. The remedy is usually a reverse of the process: plenty of exercise and a restricted diet.

An irritable stomach in the dog will often retain raw hamburger steak in limited quantities when other food is vomited. Liquids can be supplied by rectal injection with little trouble and effectively; or they will be retained in the stomach in moderate quantities under most conditions if given a few minutes after a dose of brandy somewhat diluted. Sometimes it is necessary to give the brandy in capsules and give it undiluted.

A somewhat heroic treatment in conditions of this kind is to put the dog up where he has considerable freedom of movement and give him no food except an onion and leave him there without other food until the onion is eaten. He will eat it before he will starve, but he will not eat it until he needs food. However, moderate feeding and rather vig-

orous exercise is more prompt in its effect and, all things considered, more humane.

In fat dogs, in those that have not been exercised and in those that have not been fed with discretion, constipation is usually to be expected and, when present, should be relieved promptly with enemas or cathartics. Raw hamburger steak in which is incorporated a liberal amount of tallow, is an excellent food for such cases.

I am assuming that there is no pathological lesion in this case that causes the vomiting, and that the animal is not suffering from disease or ailment other than the simple complaint indicated by your description.

FIRING BEST TREATMENT FOR RING-BONE

What would be your treatment for ring-bone of six months' standing? It is situated on the hind pastern, and the animal is lame continually.—H. T. C., Ill.

Reply: The treatment of a case of ring-bone, perhaps one should say, the outcome of the treatment will depend much on its location. If it is situated so near the joint as to involve the articular surface or mechanically limit extension, the prognosis is not good. Otherwise I should consider it fair to good in ring-bone of six months' standing.

My treatment is to puncture, fire immediately and if the ring-bone is very large, follow this with a blister. I should want the animal to be rested for two weeks following treatment.

NIGHT-SWEATS

I have a case of night sweats in a horse which otherwise seems to be in a normal condition. He eats well, and works well, and sweats no more than his mate while at work. He seems to be in good flesh, but regardless of whether the weather is hot or cold, he sweats at night continually. I would be glad to have suggestions as to the cause and the remedy.—J. C., N. Y.

Reply: In view of the fact that this animal is in good flesh, eats well, feels well and works well, I am in doubt as to what his trouble can be but would make the following suggestions:

Diagnosis: Hyperephidrosis.

Etiology: Debility, worms, focal infection, as nasal gleet, abscess, caries or abscessed teeth, diabetes insipidus, diabetes mellitus, etc., etc.

Treatment: Clip (by all means), whether coat is long or short. Zinc oxide in two-dram doses three times daily is very satisfactory. Fowler's solution in 4 to 6-dram doses may also be administered. Should this fail administer agaricin in 2 to 5-grain doses, t.i.d.

DON'T BE A QUITTER

Hold your Liberty bonds—first, because they are the best investment in the world, backed by every resource in the United States, and also because you have made sacrifices in order to buy them. Why turn over to someone else the contract you have entered into with the Government.

Hold them because, even though the war may be over, it has not yet been paid for. The Treasury Department must soon issue more bonds, the Fifth loan being planned for next April. Every sale now made by you makes future Government issues more difficult and more expensive. This expense must be borne by the people of the United States—therefore, why add to the already large burden being borne by the taxpayers of the country.

Hold them because the time may come when such an investment may prove to be a true friend in time of need—a guarantee against the fear of debt and insurance, against real hardship.

Hold them because the need for saving is not over. GOVERNMENT EXPENSES ARE TODAY LARGER THAN AT ANY TIME DURING THE WAR. Our brave boys in Germany and France and Russia must be paid and fed and clothed and when their work is over, transported home—back onto American soil. THEY HAVE NOT QUIT. WHY SHOULD YOU?

Hold your Liberty bonds instead of exchanging them for some other so-called security, because you know the security of your United States bond and often cannot know the worth of what is offered in exchange. The 'get-rich-quick' crook is ready to steal your bonds away from you at the first opportunity. DON'T LET HIM. Don't be swindled out of your bonds.

Hold them because of the interest they pay, because it is good business to do so. What good will the idle pleasure or needless luxury bought today with the proceeds of your bonds be to you a year from now? Your bonds work for you, drawing interest day and night, weekdays and Sundays.

By all means HOLD YOUR BONDS. DON'T BE A QUITTER. BE A PATRIOT.

WILLIAM G. McADOO,
Secretary of the Treasury.

The continued prevalence of high wool and meat values has placed the sheep business in a new light. The result will be that this phase of animal husbandry will contribute materially to the Nation's food and clothing supply. It will also add stability to our system of farming and play an important part in the more complete utilization of our agricultural resources.—*U. S. Dept. of Agri.*

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

Influenza Problems at Market Centers

INFLUENZA of the horse and kindred diseases has been taking its toll for over fifty years in this country, and the losses annually run into millions; not so much from death, but from sick animals that recover, that have to be carried through sickness and fed back into condition. Thousands of dealers all over the country have been ruined by the ravages of influenza and kindred diseases. They know how to buy horses cheap and sell them dear, but they do not figure on the loss from sickness and death. They cannot figure it, and slowly, but surely, it saps their financial life until as I say, thousands of them have been ruined. You can almost count the successful dealers in horses on your fingers. Most of those have been doing a commission business, selling other people's horses. There seems to be such a fascination about the horse business that when a man once engages in it he stays with it until his last dollar is gone.

The horse business is a good deal like a game of poker in which when a jack-pot is declared, each player chips in to the gamekeeper; and you know if you stay with it long enough who will have all the money, and this influenza and the other diseases incidental to it plays about the same part.

Preliminary investigations two years ago showed that the whole country was badly infected. Assembling points, unloading and rest stations along the railroads, market centers, cars and distributing points, all were badly infected, and it was next to impossible at that time to assemble and ship a load of horses any considerable distance without exposure. The evidence pointed to market centers as harboring a very large percentage of the infection, and accordingly when the Bureau of Animal Industry started control work, those market centers were given first attention. It was estimated by men who had their money invested in horses, that 75 per cent of all animals assembled, shipped and passing through market centers sooner or later came down with influenza or other shipping troubles, and the death rate ranged all the way from 3 per cent to as high as 35 per cent.

The disease is spread by actual contact with sick animals, by contact with the nasal or other discharges, by the dealer's hands in examining the teeth, first of the sick and then of the healthy; by using the same halters on the sick and then on the healthy. The same bridle bits are used in ailing horses and healthy ones, and I have no doubt, play an important part in the dissemination of the disease. Recovered cases from hospitals seem to convey the disease to the healthy. It has been suggested that men carried it on their feet from the sick ward to the healthy, and that dealers may take it from market centers to the country when they go to buy horses; and that cattle and sheep shipped in an infected horse car may carry it to the farm. Whether they do or not I do not know.

At the inception of the control work, the Bureau did not deem it advisable to formulate and enforce drastic regulations. In the first place, the appropriation was entirely too small to finance the work in the whole country. Again, the country was so badly infected, that if regulations had been put into effect at that time and enforced, it would have resulted in overwhelming numbers of horses in quarantine. Again, the United States and the Allies were purchasing war horses in all parts of the country, and regulations strictly enforced at that time would have interfered seriously with the interstate movement of horses which were required for immediate use, and also would have interfered with the legitimate trade, so it was deemed advisable to start out in sort of an advisory way, and advise with the dealers as to the necessity of isolating the sick, and keeping their places in sanitary condition, cleaning and disinfecting them regularly.

The Bureau began first to clean up market centers, and later on the War Department called on men from the Bureau to do sanitary work, mostly at shipping points, small market places where the Bureau was not working.

Men were selected for the most part who had had previous experience in the foot-and-mouth disease, and knew how to do sanitary work. Their work has been very good, as the results show. They have visited nearly every unloading station in the United States along the different railroads and have remodeled and rebuilt these places, floored them with stone or other material, put in better watering and feeding facilities, cleaned and disinfected them, and as a result it is now possible to ship horses almost any distance without exposure tc disease. Lately four carloads of horses were received at Kansas City from California, that had been unloaded five times en route for feed, rest and water, and had been about two weeks on the road, and none of the horses were sick. Some of them were presented for inspection to the British remount buyers, and none of them were sick, all remained healthy. That was considered impossible two years ago, and perhaps was impossible. They came through apparently without exposure.

Captain Mahaffy, of the Quartermaster's Department, also reports the purchase of 90 three-year-olds in Virginia, and surrounding states. They were all purchased from farmers, shipped in disinfected cars, and all assembled at Front Royal, Virginia. Those colts, at the time of the last report, were all healthy, showing that it is possible to ship horses at a most susceptible age without exposure.

The first thing that attracts one's attention when entering a market stable is the construction of the buildings and the fittings. Most of these stables have been built piece-meal, without any regard to sanitary requirements. It is next to impossible to maintain them in sanitary condition, and a regulation seems necessary to compel the rebuilding or reconstruction of these buildings before we can make much headway.

Mule pens, just to illustrate, are all alike—an alley running full length of the stable with the pens on each side. These pens hold about a carload each. There is a hay-rack on one side, running the entire length and a feed trough on the other side. There is communication between the animals in three pens, so that a sick animal in one pen can contaminate the feed and infect sixty mules.

The method of handling mules, is to run them out into the alleys from these points, sort them and show them in the alleys, and put them back in the pens; and at the end of the day the manure is swept from the alleys, so that if one pen is infected all are infected.

Men who have been in the mule business all their lives, have a notion that the only way to keep mules healthy is to dig a hole down in the ground about two feet and allow the manure to accumulate in that opening, so that the fermentation from the manure generates heat to keep the mules healthy and slick-haired. When you attempt to tell them that that is not necessary, they will tell you that they have been in the mule business all their lives, and know more about such things than you do. They are a good deal like the Irishman who said: "I am open to conviction, but show me the man that can convince me."

The hardest question that we have had to deal with in market centers is the removal of manure. That may seem a very easy problem to handle, but last winter the manure was sometimes allowed to accumulate until there were hundreds and thousands of loads in the market. Owing to a shortage of labor, and a shortage of cars, and the weather conditions all over the country, it was impossible to get this manure removed.

I want to say just a few words about state co-operation. It is gratifying to have the co-operation of the different states in this control work. Many of them have gotten out special orders, compelling dealers in their states to clean and disinfect the premises under state or War Department supervision. This has been a great help. The results in the states justify their action in the matter.

There is no question but that isolation of the sick has brought about good results. At Kansas City they had no isolation hospital, no place to keep the sick. They were all around mingling with the healthy. Some little time before we got there, they set aside a building for isolation purposes and found 164 sick animals in the market, and placed them in this big building. The nxet month that was cut down to less than one hundred, and other markets showed correspondingly good results from this isolation of the sick.

Show horses at the stock yards in Chicago during the International Live Stock Exposition do not suffer from influenza; nor are they attacked after they get home. Yet they are almost all colts, which as you know are susceptible to this disease. I attribute this immunity to two causes. First of all, they are generally shipped in box cars that have not been occupied by horses; and secondly, the place where they are taken for show purposes receives thorough renovation and disinfection. Then again, most owners have used biologics with varying results. The evidence is in favor of the biologics.

The question of immunity comes up, and the degree of immunity rendered by an attack of the disease. There are 150 horses at the stock yards in Chicago that were bought by the Swiss Government—some of them were bought two years ago and for some reason they have not shipped them, and they were sent out to a farm for pasture all summer, and now have been brought back to the yards. They are right in the heart of the market, a place not in very good sanitary condition, in a shed, and yet not one of them is sick, showing that they have acquired immunity. I was told by the buyer of these horses, that about 50 per

cent of them had been in the hospital, at some time during their stay.

There are 500 sick horses at the Chicago stock yards right now, and among them one may see cases of influenza, pneumonia and strangles, in all their glory, or rather all their malignancy. The reason for this large number of sick animals here at the present time is, that this place has been made a clearing house for the different war departments for animals that are shipped from all over the country, and the sick have been sorted out and the healthy sent on.

There are a number of questions that I consider have an important bearing on control work for influenza and kindred diseases:

First, how early in the initial stages of the disease may a horse spread infection?

How long after complete recovery is he a germ spreader?

Would you recommend regulations compelling the rebuilding or reconstruction or remodeling of all stables in our market centers, to comply with sanitary requirements?

Is there any cheap and effectual way, or is it practicable to disinfect manure in the stables, and allow it to remain there, and allow horses to occupy those pens?

Is there any practical and unobjectionable way to disinfect a recovered case from a hospital.

The well animals are turned loose in pens with the sick. Their hide has been licked by sick animals and there are accumulations of nasal discharges and discharges from abscesses on their hides, and they are led from the hospital into the stable in that condition. I would like to know of some effectual and unobjectionable way that a horse can be disinfected. Of course, the weather conditions will have to be taken into consideration.

Are mules immune to influenza?

Our inspector at St. Louis, which is the largest horse market in the world, states that over 90 per cent of mules are immune to influenza. Last month at Kansas City there were about 70 animals in the hospital, 60 of which were mules, and perhaps 55 of them were complicated strangles, so it does seem as though mules are to a great extent immune from influenza, although they are very susceptible to strangles and pneumonia.

We do not hear much about the enteric form of influenza, but we do see quite a number of cases in central markets, and as far as I have seen they are all fatal. I have never yet seen a case of enteric influenza recover.

I would like to know if anyone knows whether that form of influenza is due to the organisms of hemorrhagic septicemia, and if so, can it be successfully treated with biologics?

The contagiousness of pneumonia is another question. The pneumonia ward in the hospital at Kansas City is a great big mule pen, and during the month of October there were some six or seven cases of pneumonia there, several of which died. The other animals all came from various points, and not a single animal contracted pneumonia, so it would seem the disease is not very contagious.

I would like to know if this pneumonia in mules especially is due to the organism of hemorrhagic septicemia, and if so, can it be treated with biologics?

As to the disinfection of cars, would you recommend that all cars carrying horses, whether the infection can be demonstrated or not, should be disinfected, or would you recommend only disinfection of cars carrying horses from market centers? I would like to see a discussion of the subject.

Kansas City, Mo. H. A. HAWLEY.

HEMORRHAGIC SEPTICEMIA INFECTIONS

In the last two numbers of the Journal, I have noted the articles on "Hemorrhagic Septicemia." I noted in particular that one writer doubted the infection spreading to animals on a farm from infected animals brought in. That such infection does take place I know to be a positive fact.

I have a client who owns a pure-bred Hereford herd, who five years ago, bought twenty pure-bred Hereford calves in Illinois, brought them to his place and turned them in with his other cattle. Within a few days, four of the shipped-in cattle died with the intestinal and pectoral form of hemorrhagic septicemia. Since then he has lost from four to six head every spring and fall. I took charge of the herd this fall. He told me that he had called in several veterinarians and they had given intestinal antiseptics and physics until he was "pot-bellied on that kind of treatment." He said he had a sick calf and wanted me to come out and see what I could do for it.

I called at his place and after examining the sick animal, gave a diagnosis of hemorrhagic septicemia. I called his attention to several other calves that were coughing. The sick calf died and after autopsy we sent the heart and portions of the lungs to a laboratory for examination. I vaccinated all of the other sixty head, using 5 c.c. of Cutter's hemorrhagic septicemia vaccine.

The returns from the laboratory examination gave a diagnosis of hemorrhagic septicemia. Another calf died yesterday. It was only two weeks old and had not been vaccinated. I posted it and sent portions of the lungs to Cutter's to have autogenous vaccine prepared. Does not the history indicate that the twenty head of cattle shipped in from Illinois five years ago infected the herd, as previous to that time, there had been no hemorrhagic septicemia in the herd?

Another client bought forty-five steers at the Chicago Stock Yards six weeks ago. They

all took sick three days after he got them home. Four died and I posted the last one that died. I vaccinated all the others with 5 c.c. Cutter's vaccine, and no more deaths have occurred. The returns from the specimens sent to the laboratory gave the same old reading—hemorrhagic septicemia.

Another client brought in thirty-five head from the Chicago Stock Yards, all coughing; some with bloody discharge. I gave all of this bunch 10 c.c. Cutter's vaccine, with the result that no deaths occurred. The reading from laboratory examination of a blood sample from the jugular vein of the worst case showed that it was hemorrhagic septicemia.

Another client called me to see a yearling steer, which he told me was passing pure blood from the bowels. I went out at once and gave him 10 c.c. hemorrhagic septicemia vaccine intravenously. I also gave him 1.5 grains of atropin sulphate, hypodermically. I prescribed nux and gentian, fluid extract, tablespoonful every four hours. The next morning the patient was better and recovery followed quickly.

Eminence, Ky. W. R. MORGAN.

THE PUBLIC BE PLEASED

Primarily each and every man engaged in live stock sanitary control work fully realizes the fact that, after all, sanitary control depends upon public opinion. If we live in a community where the public is heartily in favor of the suppression of tuberculosis or any other disease, we will find it a very easy matter to enforce any law or regulation pertaining thereto. If, on the contrary, public opinion—and public opinion is nearly always self-interest, dollar-interest—if public opinion is not in favor of the rigid enforcement of such rules or regulations, live stock sanitary officials find themselves engaged in an almost hopeless task. For that reason, I believe associations interested in live stock sanitation ought to go on record first of all, in outlining policies for adoption, and secondly, go out individually as well as collectively to stimulate and bring about a better understanding among the public regarding such matters, and thus create interest in our work. We could practically enforce any rigid or even radical regulation in the control of tuberculosis in Georgia, and I believe the same is true in every other state where tuberculosis is as rare as it is in the southeastern section of the United States. The most radical legislation, the most radical rules can be adopted and enforced. But let the majority of the people be losers in such a transaction and they will be found all around asking you to put on the soft pedal. So, as I say, we have two viewpoints to harmonize. First, that of the sections that are practically free from tuberculosis, and I wish to go on record as saying that we are in favor of any kind of radical legislation, radical laws, involving the control and suppression of tuberculosis.

On the other hand, I fully concede that the legislation that these sections would subscribe to might be rather harsh and difficult to enforce in states where it is necessary to deal with tuberculosis on an extensive scale. I believe, however, that the plan to establish state-accredited herds, is the proper method by which to induce the breeders to clean up, and I want to say that in dealing with this problem we have to deal with both the breeder and the broker of cattle. I do not think we will ever see the day when cattle brokers will good-naturedly fall in line with tick eradication work. But, with the breeder, the man who raises cattle expressly for sale, I believe if we show him that it is to his own individual interest to clean up his herd and make it easy for him, and furnish some kind of incentive, some kind of special inducement for him, I believe that we can and will have their cooperation, and when we do that the fight will practically be won.

I think that the sale of tuberculin should be restricted. I believe that if the federal government would prohibit the sending of tuberculin interstate, except to state live stock sanitary officials, it could be properly handled, and the officials could see that the tuberculin was properly distributed within that state.

Just as long as every Tom, Dick, and Harry can buy tuberculin you may rest assured that it is going to be used in a way which will disgust live stock sanitary people. It cannot be otherwise. I believe that tuberculin should be used only as a diagnostic agent in testing for tuberculosis.

Our past experience in the control of tuberculosis has shown that many officials should not be supplied with tuberculin for making tuberculin tests. Either they are not qualified or they are not conscientious, at any rate they have taken tests under conditions where the tests were worthless, and where the people that employed them were much disappointed in the service that had been rendered them. They paid a good fee, and had absolutely no service, you might say, so I believe that tuberculin should be distributed within the state, exclusively, through the live stock sanitary officials. Those officials would have the names of all the people who have tuberculin, and when tests are made we can be reasonably sure that the errors have been reduced to a minimum.

In reference to the state-accredited herds, I am in favor of extending the work of accrediting state and federal-accredited herds. In my judgment, this is not a matter of speeding up tuberculin-tested accredited herds. It is rather the setting of a mark that is worth while, a mark that the best of breeders will consider worth while. If we make the tuberculin-tested accredited herd a cheap affair, it

will tend to remove the incentive; but if it is made extremely difficult to get onto the list and made absolutely sure that these specified herds are just as nearly free from tuberculosis as is humanly possible, the breeder will have some real goal to work for, and in my opinion we will have his complete and hearty co-operation.

PETER BAHNSEN,
Athens, Ga. State Veterinarian.

NEW BLACK-LEG PREVENTION PRODUCTS HARMLESS AND FORTY TIMES AS EFFECTIVE AS THE OLD

In the fall of 1917 we sent a questionnaire to five hundred people who had purchased a total of 150,000 doses of powdered vaccine from us, and the answers showed that the loss generally following vaccination with the powdered vaccine is about one-fourth of one per cent. However, I do not think this is the average loss following the use of powdered vaccine, since many people have been persuaded to purchase aggressin, or the tissue filtrate, if we may call it that. I am inclined to think those who have had serious losses, and those who have cattle upon infected ground have given up the use of the powdered vaccine and have changed to the aggressin or tissue filtrate, but the reports show in a degree the losses which occur following the use of vaccine.

The use of the germ-free vaccine, aggressin, and the results following its use, have been exceedingly encouraging, and we find that following the use of the germ-free vaccine, which we have been putting out for three years, the losses are almost nil. Once in a great while a loss is reported, but I think the losses probably will not average one in thirty-thousand cases. In most cases no one has any kick to register. There is always the possibility that the calf did not get the disease, was not vaccinated or something of that kind.

Over a year ago we began some experiments with the filtrate. We vaccinated animals in herds, part of them with filtrate, part with aggressin. We vaccinated the steers with one, and heifers with the other, so there would be no danger of confusing them. Then in ten days these animals were given virus, and in every case the filtrate showed as much protection as the aggressin, in many instances better. There were some losses from the cattle that received aggressin and afterwards virus.

It seems that the immunization is produced by the toxin which the organisms produce. It is difficult to measure this toxin, because the toxin is not a toxin in the sense that there is a toxin of tetanus. We began to give rather large doses of toxin from blackleg to guinea-pigs without fatalities. The question is, how much toxin do these vaccines require.

We have tested quite a number of animals with aggressin and filtrates, against immune serum. There is some variation, but there does not seem to be a great deal of variation between filtrates which we are making and the aggressin in the quantity of toxin present. These tests show that the amount of toxin present has a neutralizing effect upon serum equal to about 20 to 40 times—that is a killing dose of blackleg virus, or of a blackleg filtrate vaccine. Therefore, it would seem from some of the reports that the filtrates and the aggressin which we have been using have from 20 to 40 times the immunizing property of the powdered vaccines.

L. W. GOSS.
Manhattan, Kansas.

MIXED INFECTION IN HORSES

From the limited investigations that we have been able to make and from the reading of reports of others, it would seem that there is little doubt that there is a disease in horses caused by a filterable virus. That disease which I suspect is the original influenza, does not appear to have found as wide a field as some people think it has.

We have several other conditions to consider. We find that streptococci cause a variety of conditions that are usually designated as influenza. We find also that bipolar organisms properly inoculated in hemorrhagic septicemia cause a variety of conditions that have usually been designated as influenza. We have repeatedly isolated bipolar organisms from pneumonia cases, more particularly from the type of pneumonia that is usually found in sales stables. I have made no bacteriological study during the last year or two in Kansas City, but prior to that time we found bipolar organisms; found them prevailing in the blood streams, and found them also in the lungs.

The lack of contagiousness of pneumonia as it now exists, has been noted. That is rather characteristic of these bipolar organisms, at least in cattle. We have found that under ordinary conditions it is necessary that the cattle be predisposed even though exposed to infection, before they can be successfully infected. Predisposition seems necessary, and perhaps that is the reason that the penumonic type of influenza is not very contagious, and not easily communicated from one animal to another.

The enteric form of so-called influenza we have found on autoposies of a great many animals, is manifested by a hemorrhagic enteritis. The capillaries in the bowel become practically a teeming mass of bipolar organisms, and lesions similar to the type of lesion found in enteric hemorrhagic septicemia. I am somewhat at a loss to know whether we have been at fault in our technic, whether we have failed to recognize and combine all of

these conditions as one test, or whether our fault lies in a lack of clear conception.

In my judgment there are several diseases of horses that we have been wont to call influenza, and a little later I believe that they will be differentiated, just as we are beginning to differentiate diseases of hogs.

Kansas City, Mo. A. T. KINSLEY.

STANDARDIZATION OF BIOLOGICS NEEDED

The standardization of biologic products is a great problem. How are we going to standardize these products so that we know that when we inject a given quantity into an animal that we can do the same thing again later? There is a great difference, perhaps, in the experimental animals that we deal with. I have taken blackleg virus and killed guinea-pigs with it, and perhaps a week later used the same virus in another group, and killed only a small number. It will not do to try to settle these things in experiment stations. We must go out in the field. We are encouraged by the results obtained in the laboratory, but let us not stop there; let us try to put these products on a basis where they not only will prove harmless, but will also prove universally useful in the field.

Lincoln, Nebr. L. VAN ES.

IRREGULARITIES IN THE GAIT OF AMERICAN HORSES

There can be no doubt since our inspection of thousands of horses over the greater part of the United States but that irregularities in the gait are more often overlooked than any other one fault of our horses; especially is this true of our draft horses. A small percentage of horses have a good gait but the greater portion of them are hardly passable. Too little stress has been laid upon good-gaited breeding stock, especially among draft animals. Too many people are content to overlook a poor gait in a stallion or mare if they have a good conformation and score high.

Too much stress cannot be brought to bear upon the breeding of draft horses to insure a good open, active trot. In buying horses for the British army, their officers pay much attention to the gait of the horses that they buy and will often overlook other defects if the animal is well gaited. They are to be commended for this foresight, and no doubt the use of such large numbers of horses in our army during this war will do more than anything in the history of our breeding industry to show us our weaknesses as breeders of utility draft horses. Army work of itself is much different from farm work and animals that do farm work very satisfactorily are frequently not able to do army work at all. During active campaigns the army horse is often compelled to go for hours without feed and water; at other times extreme speed is required for quite some little time over a considerable distance and for these reasons an army horse should be very active and be well gaited and able to work well without food for several hours.

Irregularities in the gait of horses may be caused from the conformation of the feet and legs and also from the shoeing. Many such cases could have been greatly benefited if the horse's feet had had proper care during colthood days. Not enough attention is paid to the growing colt's feet. They should always be kept well trimmed and level. Many of the defects of gait that are the result of neglected feet during the early life of the colt can be avoided.

Many of the irregularities in the gait can be foretold from the conformation of the animal's legs; thus a "base-narrow" or "nigger-heeled" horse will usually "interfere", and if he is "calf-kneed" along with this, as many pacers are, his knees will likely hit. A horse that is "base-wide" or "pigeon-toed" will usually paddle when he trots. The horse that is extremely wide between the legs will usually "roll," "wing," or "wind" when moving faster than a walk. One that stands with the points of the hocks very near each other will often "forge" when trotting.

Horses with two gaits are bought for the army, i. e., the walk and the trot. The gallop or run is the only other gait that is permitted with army horses, and as every horse can gallop or run, only the walk and trot are given much consideration. The walk is a slow four-beat gait and should be executed with snap and vigor and should among breeders be considered one of the most useful gaits of the draft horse, while among most of them it is considered as simply useful to afford the horse rest or for the performance of slow work. By close attention to this feature among draft horses, it is possible to breed animals with more style and speed at the walking gait than those that we now have. The trot is a rapid two-beat gait in which the diagonal front and hind legs act together. The two kinds of trotting gaits that are of use as a utility gait are those of the harness horse, which is usually a rapid and rather long stride, and the trot of the saddle-gaited horse which is usually shorter, more springy and more elastic than that of the harness horse. This explains why very few harness horses make easy mounts, as they have too long a stride, and such extension destroys the springy effect, hence they ride hard, while the stride of the saddle horse is shorter and far more comfortable to the rider.

"Interfering" is the striking of the fetlock of the supporting leg with the foot of the striding leg and occurs with about the same regularity in the front and the hind legs.

"Knee-hitting" is the striking of the front knee of the supporting leg with the striding

leg; this is usually found in horses that are very narrow in front and in "nigger-heeled" horses.

"Forging" is the striking of the bottom of the front foot or the shoe of the front foot with the toe of the hind foot of the corresponding side. It occurs during trotting mainly.

"Scalping" is the striking of the hind foot at about the top of the hoof and at the junction of the skin with the horn of the hoof on the ends of the shoes of the corresponding front hoof. It occurs only at the trot, and occurs just after the foot has left the ground. If it occurred earlier in the stride it would be known as "forging."

"Over-reaching" is a defect of the trotting gait in which the hind foot is brought forward before the front foot has left the ground and it strikes the front foot in the region of the heel, ordinarily, but may strike the leg anywhere from the heel to about the front knee, but the usual place is the heel.

"Speeding cutting" is the striking of the inside of the hind leg on the side of the front foot on the same side while trotting, and usually occurs while going at top speed and in horses that trot very wide behind. It may also occur in horses that have more hock action than knee action, when they go at top speed. This may also occur in the horse that travels very close behind and when it does he strikes his hind leg somewhere from the fetlock to the hock against the inside of the foot of the diagonal front foot, just after it has left the ground.

"Paddling" is an outward swinging of the leg in the direction of travel and occurs in toe-narrow or pigeon-toed horses.

"Rolling" is a defect in the gait of horses that are very wide between the fore legs and consists in excessive side motion of the shoulders.

"Pounding" is an irregularity of the trotting gait that consists in the placing of the front feet down very quickly and with considerable force at the conclusion of the step.

"Trappy-gaited" is another distinctive trotting irregularity, consisting of a very short, snappy step with considerable flexion of the knees.

"Winging" is very much the same as "paddling" only more exaggerated, due to the fact that the horse steps very high.

"Winding" is the placing of the striding leg around and in front of the supporting leg, much the same as rope-walkers do, thus the tracks of the feet are almost in a straight line.

"Dwelling" is that noticeable stoppage in the trotting gait of some horses just before the conclusion of the stride that has the appearance of complete stopping of the animal.

"Pointing" is a distinctive position of the front foot in which it is extended more than normal. This is quite noticeable in the trot of the thoroughbred and causes them to appear as though their legs were stiff or lacked the required joints to give the necessary flexion.

LIEUT. G. H. CONN.

Camp Greene, N. C.

COUNTY AGENTS OBSTRUCT DISEASE CONTROL WORK IN KANSAS

My purpose is not to knock the county agent, or anything of the kind, but what little hindrance we have had to the work of the hog cholera control in Kansas has been brought about by the county agent. He is a hard fellow to deal with, and the Extension Department of our college unfortunately has at the head of it, or else it is the system all over the country—I think it is probably all over the country, the same as with us—a disturber who is of no benefit to us, and so we have kicked him out. He does not take any part in our live stock sanitary work and we won't let him, and that is not saying that we are not obeying the law either, because the law gives us the right, or gives the live stock commissioner the right to issue the rules under which we will proceed, and we are proceeding under that sort of a rule.

J. H. MERCER,
State Live Stock Commissioner.

Topeka, Kansas.

IMPORTANCE OF CLEAN MILK AND ESTABLISHMENT OF COUNTY FARMS WITH DETENTION STABLES

Unclean milk, milk containing impurities from the stable as well as tuberculosis bacilli and other pathogenic bacteria has brought pasteurization into use for the purpose of destroying the ill effects of these impurities, which it undoubtedly neutralizes to a certain extent, but only at the expense of the flavor, taste, and part of the nutritive value of the raw milk; besides, if pasteurized milk is not properly kept, it putrifies more quickly than raw milk because the lactic acid bacteria is destroyed under the process of pasteurization.

It seems to me that it would be far more sensible to endeavor to produce clean raw milk than to spend money, time and energy on cleaning dirty milk, or rather destroying the ill effects of the impurities it contains, and after all obtain only an inferior food article.

Clean milk can be obtained only from healthy cows, kept in clean stables and milked by clean attendants.

A clean stable can be secured only by immediate automatic removal of the excrements.

Proper attendants can be secured only when the work in the stable is made more attractive.

Healthy cows can best be secured by the cooperation of the state and the milk producers.

It is a fact that a healthy calf, raised under

natural conditions does not develop tuberculosis but grows into a healthy cow. I, therefore, reason that it would be both prudent and economic for the state to use some of its vast unproductive lands for the purpose of raising healthy cows to supply the farmers at cost price, thereby securing healthy milk producing herds. Instead of the state killing and paying the farmer for his tuberculous cow, it should reimburse him with healthy cows, the state taking the farmer's reacting cows in exchange and utilizing the same for breeding or other purposes, which ever may be more profitable, and thus save great loss to both the farmer and the state.

It seems self-evident that this arrangement would meet with the approval and willing cooperation of the farmer, as it would leave no motive on his part to conceal the presence of diseased cows in his herd.

The state can thus not only make profitable use of idle lands and effectively help to eradicate tuberculosis from the cows throughout the state, but it can, in my opinion, go one step further by cutting broad avenues (half a mile through our large forests), cultivating these strips of land, locating farms thereon and breed there the very best thoroughbred cattle in existence. Farms thus located would be one of the best means of checking the devastating forest fires which annually consume much valuable property besides endangering the lives of both men and beasts.

It seems to me that it is the plain duty of the state to make the best use of its natural resources, particularly where private capital and enterprise are not able to cope with it, and especially where, as I have indicated, it would serve more than one purpose, namely, the conserving and improving of its natural resources, besides going far toward exterminating tuberculosis from the milk-producing herds, thus assuring a healthy and pure milk supply which does not need to be pasteurized.

A similar systematic action throughout all the states in the union, assisted and directed by the national government, would before many years result in great good to the community in the direction which I have indicated, and enable the present generation to hand down to future generations their natural heritage, not only in a well conserved but a vastly improved condition.

In short, the state should commence the systematic establishment of county farms with stables furnished with the best, up-to-date sanitary equipment, such stables to be used as detention stables in epizootics, and for detention of tuberculous and aborting cows where such cases could be controlled and receive better treatment than is possible in the prevailing insanitary stables.

Such farms and stables could be established jointly by the state and county and perhaps arranged so that they could be self or almost self-supporting.

The national government should establish one model farm in each state to be used for demonstrating new methods. We are all, including the farmers, more or less Missourians—we like to be shown.

P. C. JUHL, G. R. C. V. S. C.,
Tottenville, N. Y. Copenhagen, Denmark.

A BETTER EAR-MARKER NEEDED

The Bureau of Animal Industry for more than ten years, has been urging the use of ear-tags for identification of cattle that have been tuberculin-tested. They use one kind of a tag for an animal that passes, that is, the initials U. S. B. A. I., and then a serial number on it, and another shaped tag for reactors, but we have found after years of experience that no method of metal tags that has ever been employed has proved satisfactory. The cattle get into a bushy country and the tags pull out of the ears. We have used tags with a soft metal clip, which will stay put in an animal's ear. I believe if we can get down to a plan of tattooing cattle, as is applied in the Hereford Association, we will have the very finest system of indentification that we can secure. I believe it will be possible to develop some kind of tattooing ink that can be applied on cattle with black ears, and I believe it can be employed successfully with grade, as well as pure-bred cattle.

Washington, D. C. J. A. KIERNAN.

LESIONS OF NECROBACILLOSIS ON AUTOPSY DO NOT PROVE DEATH DUE TO THE BACILLUS NECROPHORUS

Just recently, in connection with an outbreak of hog cholera, there was just one pig in the litter that I found infected with this necrobacillosis. That pig was infected to the point where the mandible was practically eaten away, and it was surprising that a pig could live in such a condition; and yet he was running around with no apparent general disturbance, except such emaciation as might be expected to accompany the loss of food which he certainly sustained.

One of the first cases of necrobacillosis that I ever saw, occurred on a farm where there were three litters of pigs together. As it happened, they were at the experiment station. In one litter of pigs the affection was pretty well established before it was discovered; yet most of them recovered under treatment. We treated the udders of the sows with an antiseptic solution, but the infected animals were not removed from the infected pen and the other two litters did not become infected. Since then I have seen similar instances in the field, where absolutely no preventive measures had been used, and yet the results were parallel—the infection did not spread to other litters.

We have found one animal infected in a lit-

ter, and the others apparently all right. We have found one litter infected and other litters running with them all right. It usually occurs among sucklings, and is usually attributed to teething. A pig really is getting teeth during all of his natural life, i. e., about nine months. He is getting teeth practically from birth until slaughtered at about nine months. It seems to me that the susceptibility of sucklings can be attributed mainly to just the act of suckling. We find these pigs in such conditions sometimes that we have to pry their mouths open, in order to make them show the teeth. I have seen an infected pig go to the sow to suckle, and just go through the motion of suckling, not taking hold of the teat at all. They keep their mouths closed, apparently just from pain, after they are badly affected.

I think that primarily the thing we have to deal with is the diagnosis of these diseases in the field, and I am inclined to believe that we should be pretty cautious about thinking that every time we find a certain lesion, that we have the primary cause of the lesion.

It is a very significant fact that the lesions of necrotic enteritis occur most constantly at the very place where the lesions on the mucosa are most constant in hog cholera. This is a very significant fact in differentiating all these diseases, and the only logical way that we can go about it, it seems to me, is to prove either the presence or the absence of the filterable virus. If we cannot do that, we cannot proceed very far. It makes no difference if we find hemorrhagic septicemia; it makes no difference if we kill a rabbit with it, if we cannot prove that hemorrhagic septicemia is what killed that pig. I can say that after considerable investigation—and whether or not that is true with necrobacillosis, I do not know—but it seems that we must guard against jumping at the conclusion that death is due to the organism of necrobacillosis.

When we get down to the question of proving the presence or absence of the filterable virus, we find several things to contend with The man who works on hog cholera in a laboratory is very likely to think that the diagnosis of hog cholera from the lesion is an easy matter; but when he goes out and begins making autopsies he finds that it is a very different matter.

I think the thing we need to know most is whether in the domesticated animal this bacillus necrophorus releases toxin, and to what degree it causes metastatis, and until we determine these two points we cannot proceed very far.

In general, I believe we should direct our efforts toward the primary cause as well as toward the secondary cause. We know of many things that irritate the mucous membrane, but I think we should look behind the bacillus necrophorus, or any of these other organisms, before we decide that it is caused by bacilli or a necrotic toxemia, or whatever the condition happens to be.

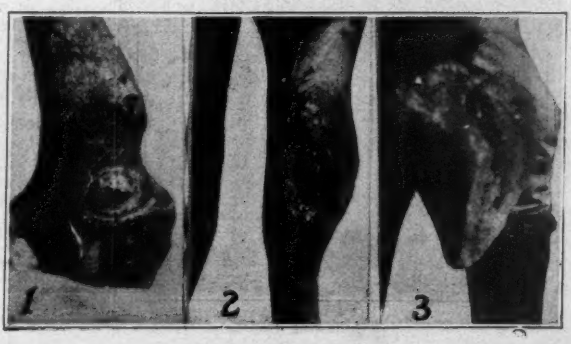
Ithaca, N. Y. R. R. BIRCH.

LARGE DOSES OF VIRUS DESIRABLE FOR IMMUNIZATION

I appeal to the veterinarian who wants to build up a reputation in a community as a successful hog immunizer, to get rid of his fear of virus and use it freely. The government, in my judgment, has made a mistake in setting 2 c. c. of virus as the maximum dose. I am speaking now of absolutely healthy herds. In my opinion 2 c. c. of virus may make a very fair minimum dose, but there is no such thing as a maximum dose, provided the proper kind of serum is used. It does not require an unusually large amount of serum in my opinion to offset the virus. If 50 c. c. of serum is a proper dose to be given a hog of a certain size, it will protect them against 5 or 10 c. c. virus, and when you have immunized a hog with plenty of virus, say 5 c. c. then you have permanent immunity, and the operator and the owner can go to bed and sleep, knowing that the hogs are immune.

When breaks occur at different intervals, some ten days, some thirty days, others three to six months, following vaccination, it seems self-evident that too little virus has been used, and they have not received immunization.

I feel, too, that if very much larger amounts of virus are used, we will be able to reduce



1. Necrophorus infection of hoof. Starting as thrush the infection penetrated to the deep flexor tendon, later to the outer lateral cartilage. Recovery followed the removal of both tendon and cartilage. 2. Necrophorus infection in region of knee after necrotic tissue had been removed. 3. Necrophorus infection in region of pastern and cornet, terminating in necrosis of the lateral cartilage. These cases, reported by Lt. W. F. Nolechek, came under his observation while in the service at Camp Hancock, Augusta, Ga.

a considerable proportion of our hemorrhagic septicemia, necrobacillosis and tuberculosis. I am not taking the position that immunization for hog cholera carries immunization against these other diseases. By no means. But we have every reason to believe that as we are constantly fighting hemorrhagic septicemia and necrobacillosis and the germs of tuberculosis, they are there; they are everywhere. If an imperfectly immunized hog is fighting not only hemorrhagic septicemia and necrobacillosis, but also hog cholera at the same time, it naturally follows that if we can eliminate hog cholera, we have at least a third better chance to elminate the others; we are better able to avoid the other infection if he does not at the same time have hog cholera.

My plea to the veterinarian who is in the field and wants to build up a reputation as a hog immunizer is: Do not be afraid of virus, but give it freely. Do not limit the use to one or two or three c. c. Do not hesitate to use five or ten or more, because they cannot do any harm, provided, of course, you have the proper kind of serum, and, in my judgment, you will have far better results.

C. G. LAMB,
State Veterinarian.

Denver, Colo.

FIBROMA RESULTING FROM FRACTURE

The accompanying illustration shows a fibroma on the lateral volar aspect of the metacarpus resulting from a fracture. The subject, a three-year-old gelding, had suffered simple transverse a fracture of the metacarpus some six months previous, at which time the animal was treated by Dr. Manning and myself, and subsequently returned to pasture. Six months later the subject was again presented at our hospital, having developed a fibroma on the lateral volar aspect of the metacarpus, over the site of the fracture.

The growth was removed, and appearances of the limb indicate that recovery without recurrence or serious blemish may be expected.

On section, the tumor was shown to be traversed by numerous canals containing mucoid tissue. The unusual location and extreme size of the growth make the case of interest.

Fibroma on metacarpus, following transverse fracture.

David City, Neb. P. H. RADFORD.

MIXED INFECTION IN SWINE ENGAGES ATTENTION

States in the vicinity of the State of Illinois have been experiencing an unusually hard summer in regard to the control of diseases in swine. I do not believe today that there is any one question that is as paramount in the mind of the practitioner of the middle-west, as the question of mixed infection among swine, hemorrhagic septicemia among swine and breaks following the immunization of hogs. I am absolutely certain that there is no other subject of quite so much importance today as this particular one.

E. A. CAHILL.

Indianapolis.

HOG CHOLERA REGULATIONS IN IOWA

When hogs upon any farm or premises in Iowa are sick or show symptoms of cholera, it shall be the duty of the owner or person having supervision of such hogs to immediately report same to the state veterinarian or government inspector in charge of hog cholera control work in the county in which said hogs are located. Upon receiving such notice the state veterinarian or government inspector will promptly investigate the case. If cholera is present the regular quarantine card shall be posted and the owner or person having supervision of the hogs so diseased will be required:

1. To shut up his sick hogs or confine them under cover away from all carriers of infection.
2. To vaccinate the herd.
3. To burn or bury in quicklime all dead hogs.
4. To clean and disinfect the hog houses, pens and yards where the infected hogs have been and to disinfect daily that part of the premises where the sick hogs are kept under cover. When satisfied that the herd has recovered from the disease the remaining hogs may be given their freedom on the premises and the part of the premises where the sick hogs were kept under cover shall be cleaned and disinfected.

When the foregoing rules and regulations have been complied with, the quarantine shall be revoked and placards removed by order of the state veterinarian or government inspector.

We find that the carrying out of these few short rules or suggestions will control the outbreaks.

J. I. GIBSON,
State Veterinarian.

Des Moines, Ia.

RHEUMATISM IN THE DOG

In the animal world as in the human family the term "rheumatism," defined as "an indefinite condition induced by cold or exposure, always affecting either muscle or joints, and with pain on motion as a prominent system," has been much abused. Every pain affecting the animal body which could not be accounted for otherwise has been charged to rheumatism, and indeed it is not always easy to say whether they are or not of that character. It is a constitutional disease, characterized by all the signs of inflammation, such as pain, heat, and also changes in the blood, usually recurrent in the animal as well as man, and may be seen in the acute, subacute, and chronic forms, the latter being the most common in the dog, and affecting the muscles, aponeuroses, tendons, and tendon-sheaths, voluntary muscles, and other fibrous structures. One of the most common seats of muscular rheumatism in the dog as in man, is in the back and loins, it then being known as lumbago.

There are many causes of pain in the loins, and where the case is of any duration or where there is any doubt, we must not rest satisfied until we have excluded these causes from consideration before we assume the disease to be really rheumatism of the muscles and fascia of the back of the animal. This condition may occur at any season of the year, but it is especially prevalent in the winter and the spring, and occurs quite frequently in animals that are in the prime of life.

Rheumatoid arthritis will be considered separately as a thing apart, differing essentially from the muscular disease, as it is often in the dog intimately associated with muscular rheumatism, which sometimes precedes and sometimes follows it. The duration of the disease is much the same under any mode of treatment. It may terminate in a few days, or may endure as many months; but generally the duration is four to six weeks. In nearly every case seen the general symptoms cease before the local inflammation is controlled. The disease is liable to cause complicating inflammations of the pericardium and other visceral serous membranes.

Sex has been a marked influence in predisposing to acute rheumatism in the dog in my experience, it is more frequently seen in the male, than the female. The sudden transition of the disease from one part to another (metastasis) is very characteristic of acute rheumatism, and in many cases it seems hereditary, the prelisposition being transmitted to offspring the same as in other diseases. Kennel lameness is the popular designation of laymen for rheumatic disorders, as they affect dogs.

The common, and I may say the immediate cause of rheumatism in the dog, is chilling of the surface of the body, from cold, damp weather, cold winds and draughts, the body of the animal having been previously heated by exercise, the surface cools more rapidly, by the exposure of a larger proportion of blood in the dilated cutaneous vessels to the cooling process. It is also claimed of late to be of infectious origin, but as yet this micro-organism has not been isolated. I feel certain that improper evacuations of the bowels, not necessarily constipation, but insufficient and improper, or I may say infrequent evacuations are great factors in the causation of the disease. As intestinal fermentation and putrefaction followed by improper evacuations are almost constant companions of rheumatism, treatment is futile unless this condition be corrected and elimination promoted. The animals being predisposed to it, the most

At left: 1. Typical reaction, opthalmic mallein test on six-year-old cavalry gelding, at Auxiliary Remount Depot, Camp Funston, Kan., by Major H. G. Beauman. 2. Same animal, showing swelling following subdermal thermic mallein test.

exciting causes are exposure and sudden changes of temperature. Water dogs and hunting dogs are the most commonly affected of the different breeds, after violent running and at times over-exertion, and immediately after exposing the animal to cold air or water. Any one of these may be the primary cause, but in the dog it is probably caused by a combination of two or more of the above causes. Lactic acid is stated by some to be the exciting cause, it having been found in a number of the secretions, including the healthy gastric juice, and abundantly in the juice of the dog's main diet, "meat."

Among pet dogs there seems to be at times a predisposition to rheumatism (diathesis). It may also be the sequela of some other epizootic disease. Although, as stated, it is more prevalent in winter and spring, it is by no means uncommon in warm weather or warm climates, where overheating is easily produced and subsequent chill liable to follow. Protracted stays in damp kennels, and lying or sleeping on wet ground, damp places, or on damp bedding are causative factors of rheumatism in the dog. Age has certainly no influence as a causative factor, for the young animal is attacked with rheumatism, as well as older animals, but it is seen more often in the mature animal.

Symptoms. Acute rheumatism in the dog is generally ushered in with chills, with general uneasiness, loss of appetite, and dryness of the skin, and is soon succeeded by thirst, slight rise in temperature, sleeplessness, offensive breath, and other concomitants of a mild fever, and unless the attack is very severe or acute, there is no constitutional disturbance; and in a short time there arises acute pain in one or more limbs, or back muscles, and is usually acute when the muscle is in action, and dull when the parts are at rest. Certain positions at times seem to mitigate the pain. Impairment of digestion, constipation, irritability of temper, increased respiration, hot mouth and nose, dry, hard and unyielding pulse, caused chiefly by pain, secretions impaired and altered, muscles sore, stiff, swollen and very painful may be present, but in some cases no swelling will be detected. Pain may shift from the hind to the front part, or to the opposite side and is metastatic or erratic in its character, and quite noticeable in chronic cases. In most cases there is first noticed a sudden lameness, that may be and has been mistaken for rickets, paralysis, and certain parasites, and at times treated as such, great harm resulting. The position of the animal, with arched back, is very characteristic of the disease. Crying and howling from pain is increased and more severe at night, but remits somewhat during the day. The animal will be noticed to hold his head toward the muscles that are affected, so as to relax them, and in some cases, in attempting to turn his head, turns his whole body like a pivot. Pain is caused by the least movement, as when lifting the animal to his feet, or in going up or down stairs. The animal's face denotes pain. The pain is greatly aggravated by palpation, and in some cases the animal becomes perfectly helpless. Acute rheumatism in the dog varies considerably as regards intensity and duration.

Pathology. The causative factor of muscular rheumatism is not easy to determine, yet the fact that in true muscular rheumatism, no change has been detected after death, leads to the conclusion that there are no constant anatomical lesions except those due to transient hyperemia, or to serous exudations into the muscles. Still reports have been made of alterations being found, with cloudy swelling of the liver, or degeneration of the same, and in severe cases with disintegration of the muscular tissue with rheumatic deposits, and atrophy of the affected muscles, also evidence of inflammation of the fibrous sheath of the muscles. Rheumatism in the dog is so rarely directly fatal that comparatively few observations have been made.

Treatment. Opinions are still greatly divided as to the best treatment of muscular rheumatism in the animal as well as in man, the large number of etiological factors giving no explanation of the fact that a rheumatic remedy will cure some cases, but will fail in others. Treatment should be begun by the use of emunctories. In the acute form of the disease, cathartics are of great value. They prove beneficial as evacuants, by diminishing general excitement, and as revulsives, as a determinant to the bowels.

The animal should have plenty of pure, fresh water to drink to promote diuresis. It is also important to lay great stress upon the diet, for in my opinion, it is an important factor in rheumatic troubles in the dog. Solid foods must not be given, the food being limited to milk, broth, boiled rice and milk, beef tea, soup, etc. Milk and lime water should lead in the early period of the disease. Meat is contraindicated during the active period of the disease. The animal should be kept in a warm room, or kennel, well ventilated, yet free from drafts. Much improvement should not be expected for from 4 to 6 weeks. There is more or less tendency to relapse, and this should be guarded against.

At the present time no remedy is so universally employed in the treatment of rheumatism, as salicylic acid, in its various forms. Many veterinarians have come to believe that we have in the salicylates a specific, and that belief closes up research along that line. I have had a great deal of experience with salicylates, and I must say I have not found them to be specifics. In fact, I have failed time and time again with the salicylates. I believe they will cure in some cases and fail in others. There are other drawbacks to their use in the dog, for they sometimes cause vomiting in the dog to a distressing degree with consequent severe depressant effect

upon the heart. In my hands, in treating the disease, electricity did not seem to do much good, while others claim good results from its use. It is advisable after locating the painful locations, to apply some anodyne embrocation, such as those given below. In the young animal, if there is a hereditary tendency to rheumatism, cod-liver oil acts as a prophylactic.

Treatment:

℞—Tinct. aconite rad.
Olii gaultheriae.
Chloroformi aa-1ʒ
Linimenti saponis ..... qs-ʒviii
Sig. Apply to parts affected with massage, t.i.d.

℞—Acetanilidi ..... gr. XXX
Caffeinae ..... gr. VI
Quininae valerianatis ..... gr. XXX
Camphor monobromatis ..... gr. XX
Morphinae sulphatis ..... gr. II
Caps. No. xii.
Sig. One every 4 hours.

To control pain and fever the above will be found very useful.

The following is also spoken of very highly, and in fact has proved its usefulness in rheumatism.

℞—Colchicini ..... gr. 1/25
Ext. Cimifu. Racemosae ..... gr. II
Salicylate sodium ..... gr. 1
Iodil Kali ..... gr. 1
Misce. et F. Caps. No. xxv.
Sig. One capsule t.i.d. after feeding.

OSCAR SCHRECK.

New Haven, Conn.

SALPINGITIS IN DOG

I was recently called to see a small French poodle about six years old, manifesting all symptoms of acute gastritis, with vomiting, anorexia, and slight pain. There was no history other than that the dog had just passed the period of estrum.

The animal apparently responded to the usual treatment for gastritis, in about three days.

Ten days later I was called again, the following symptoms being in evidence: Temperature of 102.5 degrees; no appetite, and the least handling induced vomiting. The abdomen was tense and in the region of the cecum there was great distention. As the bowels were moving freely, it was evident there was no obstruction of the intestines. There was no discharge from the vagina.

The prognosis was very bad and the owner was informed that the animal was in a very serious condition. The following day the animal died. Postmorten disclosed the following condition: The ovaries were swollen, and the uterus showed signs of suppuration and inflammation. Both fallopian tubes were greatly distended, with two sac-like protuberances filled with pus colored with blood. The other organs in the body appeared to be normal.

My diagnosis was endometritis with salpingitis.

This bitch had never bred or even lined, and I am unable to understand how the infection gained entrance. The ovaries were not cystic.

Atlantic City, N. J. DAVID M. SAXE.

NECROBACILLOSIS PROBABLY AN INDEPENDENT DISEASE OF HOGS

During the past three or four weeks, in our work on hog cholera, we have encountered a disease among hogs that has been very interesting to us, and which we have been investigating. The case is this: There was a cattle feeder, who had a number of pigs. He has always had his pigs vaccinated. When we went to the place—I went there with Dr. Niles—all of the pigs were sick. They had a diarrhea which was black in most cases, in all cases quite dark in color. Our first impression was that the pigs had broken as a result of simultaneous inoculation; that they had not been properly immunized against the virus with the serum. In order to test this out, we carried from our farm several pigs that we knew were immune, some of them having been immunized several months previous and we placed them on that farm, and they all contracted the same disease that the others had, although we were quite sure that they were absolutely immune against hog cholera, and I felt myself that in that case there could be no question of predisposition caused by the filterable virus.

We made bacteriological studies of some of these pigs that were infected. We injected rabbits, and made cultures, but we were unable to find any representative of the paratyphoid group, or of the hemorrhagic septicemia organism; in fact, most of our cultures at the beginning remained sterile; but on examing the smears we found a great many organisms that closely resembled the bacillus necrophorus. We found that we could inoculate rabbits and isolate the organism from the lesion, and furthermore that we were able to isolate the organism and reproduce the dis-

Dr. and Mrs. Remnandt Morgan, Winfield, West Virginia, who were married September 11, 1918.

ease which was anatomically a severe inflammation of the walls of the large intestine. I am rather inclined to believe that there is a separate independent disease of pigs, caused by the bacillus necrophorus, probably not associated with other organisms, though I realize of course, that our work has not been extensive enough to warrant the expression of a positive opinion as yet.

Washington, D. C. Marion Dorsett.

HEMORRHAGIC SEPTICEMIA OR CORN-STALK DISEASE

The first outbreak occured December 26, 1916. I was called to see a heifer showing brain symptoms, staggering gait, and temperature 103°; urination frequent. I gave physic and tonic with powdered alum to stop absorption and in one hour seemed improved. He appeared better for about four hours, then became worse and died two hours later. By this time two others were almost dead and another showed signs of troulbe. I called Dr. A. T. Kinsley to diagnose the trouble. On autopsy and history of the case he made a diagnosis of hemorrhagic septicemia. I ordered hemorrhagic bacterin. In twenty-four hours from the time the first animal showed symptoms until bacterin was given six out of thirty had died. After bacterin was given no more showed symptoms or were sick.

On January 16, 1917, another outbreak occured. Only one animal died. Autopsy showed hemorrhagic lesions. I vaccinated the remainder of the herd with no more loss.

In the fall of 1917, hemorrhagic septicemia again broke out and several good cattle died. Autopsy showed hemorrhagic septicemia lesions. Parts of different cattle were sent to laboratories and the diagnosis made was hemorrhagic septicemia. I vaccinated 1350 in 55 different herds with loss of 10 head after vaccination. In one herd two cows died after the second vaccination. This herd was taken out of a stalkfield at the time. In herds where loss after vaccination occurs, I always revaccinate. Thirty died before they were treated. Several herds were vaccinated before any loss occured and no trouble ensued. This fall there has been no trouble in my part of the country, from cattle in stalkfields. There have been some slight losses in flock sheep from hemorrhagic septicemia during the last year. The trouble seems to be due to the dry dusty season.

Winchester, Kans. D. M. Dill.

TORSION OF SMALL INTESTINE

A four-year-old stallion, running in a small pasture, was found by the owner about 10 a. m. with colic pain, rolling, sweating, and in great distress. I was called, but being away from home I did not see the horse until 6 o'clock p. m. He then seemed stupid; standing quietly; temperature, 103°, pulse 50; peristaltic sound absent. I gave arecolin, ½ gr., and strychnin ½ gr., and repeated the dose in 45 minutes. I later tried ½ gr. eserin, but got no action from the medicine. The horse would keep stepping backward when he moved. I finally told the owner that he would die. Because of twisted or locked intestines I made examination to be certain that it was not inguinal hernia.

Post-mortem showed the small intestine wrapped or looped around the mesentery artery.

This horse lived about eighteen hours after it was found sick.

Winchester, Kans. D. M. Dill.

HEMORRHAGIC SEPTICEMIA IN FOWLS

This disease is caused by the bacillus avisepticus and is very rapid in its progress.

Symptoms: The bird shows great prostration, stands around with feathers ruffled and tail drooped. It has no ambition to move about, appetite is impaired, fecal discharges are normal. Some rise of temperature is noted. Three or four birds may be found under the roosts in the morning, some of which may not have shown any adverse symptoms whatever. They usually die in from twelve to twenty-four hours.

Autopsy shows the liver and spleen enlarged, the spleen being very soft. Some necrosis may be noted in the liver, kidney and spleen. Inflammation involving portions of the large and small intestines and small pin-point hemorrhages are found at the base of the heart. The lungs show a pneumonic condition.

This disease can be controlled by the use of hemorrhagic septicemia bacterin prepared from pure cultures of bacillus avisepticus. I usually inject the bacterin in the medial side of the thigh, observing the usual antiseptic precautions.

It is well to isolate the sick birds if possible. The hen-house should be kept clean, also the nests, and should be sprayed with a whitewash solution to which may be added phenol or creolin.

Kalona, Ia. H. J. Fry.

SKIN WRONG SIDE OUT

I recently delivered what to me was rather an unusual fetus. The skin was wrong side out, the hair being on the inside, three legs and the tail being enclosed in the skin. The stomach and intestines were outside the skin, also the heart, liver and vertebrae. The head and part of the neck were normal. The calf, which was delivered manually at full term was dead. The cow lived without any further attention.

Newbern, Tenn. G. Buchanan.

REMARKABLE POINTS OF THE HORSE

The following phonetic spelling of the "Points of the Horse" appeared in the papers in a recent written examination of Cavalry N.C.O.:

1. Mussel, musel, muzzell. 2. Nostuals, nos-

tiell. 3. Fored. 5. Pole. 6. Creast. 7. Throdle, throette, throddle, throtte, throtell, throtal.

10. Brest. 15. Canton bone. 16. Back sinue, back senniew, vaxsinue, back sencue. 17. Feltlock, paston, pasturing joint. 18. Cornett, corronett, quornett. 21. Whithers, wheathers; and in addition, main for mane.—*The Army and Navy Journal.*

METHOD OF ADMINISTERING ANTHRAX VACCINE GRADUALLY.

We have for some time had an idea that a method could be devised for administering attenuated vaccines so that the escape into the tissues would be gradual and so prepare the subject by degrees for the final immunizing dose when the capsule became digested or disintegrated.

In dealing with anthrax our plan has been to place a little media on a piece of specially prepared cotton cord and inoculate it with a No. 2 spore vaccine equal in potency to Pasteurs. Incubate a sufficent time to give 30,000,000 organisms, surround with a sterile absorbent cotton plug and enclose in a filter paper envelope, gum the flaps, fold and enclose in a gelatine capsule, one-eighth inch in diameter by 0.5 inch in length. Introduce the capsule under the skin as you would a blackleg pellet.

In so far as our work on this subject has gone, it looks as though immunity can be secured by one operation without danger to the subject.

An experiment was carried out with eight susceptible agricultural animals (mules) as follows:

Two received one-tenth of a c.c. of virulent Bacillus anthracis in heavy suspension in capsules as above described.

Two controls received the same dose injected directly under the skin. They both developed the disease and had to be destroyed on the third day.

Of the animals that received the capsules, one showed a swelling about the size of a goose egg on the eighth day which had disappeared on the twelfth day; the other one had a considerable swelling on the eighth day which gradually spread to about 18 inches in diameter on the tenth day, when it began to subside and had disappeared on the twentieth day.

This latter animal had slight constitutional disturbances from the fifth to the tenth day, showing increase in pulse and two degrees increase in temperature, but never went off his feed. The other animal showed no disturbance whatever.

The controls developed marked constitutional disturbances, went off their feed and had enormous swellings, spreading from the point of injection in all directions. From this it would appear that virulent anthrax if administered gradually and in such a way that the toxins get into the tissues ahead of the spores, an immunity is produced that will guard the animals against the gradual escape of the virulent organisms.

The other four were treated with a No. 2 anthrax vaccine. Two of them received the vaccine in the "retarding capsules" and two received the same dose directly under the skin. None of these had any alarming symptoms, although it was noticed that two controls developed small painful swellings at the point of injection.

On the tenth day after vaccination the latter four received a very minute dose of virulent B. anthracis without showing any symptoms beyond a very small swelling which appeared at the point of injection on the third day, but gradually disappeared.

We find the capsules useful in hypering animals for serum.

We shall be glad to give particulars to any member of the profession who drops us a line.

CAPTAIN JAS. GREGG, R. A. V. C.

Newport News, Va.

SERUM ALONE AND SERUM-SIMULTANEOUS TREATMENT EACH HAVE A FIELD

In vaccination for the prevention of hog cholera, I think that the general tendency at present is toward a larger dose of virus, and that we must give enough virus to insure the production of actual immunity. That statement could well be supplemented by saying that we should give also a plentiful dose of serum with it. We should not under-estimate the weight of the animal that we are dosing.

I do not believe there is any one who handles hog cholera and handles it efficiently in the field who does not use the serum simultaneous treatment. There are, however, certain conditions in which we are not justified in giving simultaneous treatment.

Serum alone is indicated in young pigs, four or five weeks old, where the cholera has started. Serum alone is indicated in sows that are nursing their pigs. Serum alone is indicated where there is evidence of an infectious disease in the herd. I believe that we might say that the fear of virus is the beginning of wisdom, and when we have used it long enough we find it out.

R. R. BIRCH.

Ithaca, N. Y.

O WHERE IS YOUR DOG?

The following jingle is the first note of a systematic agitation in favor of a just and effective dog law for the protection of sheep in Wisconsin:

O where is your wandering dog tonight,

while you sweetly slumber and sleep; is he safe at home under lock and key, or out killing a neighbor's sheep? Do you always give him his daily bread, or must he hook that from the hens, and does he forage around for his eats, in the neighbor's pastures and pens? Is he out about with a troop of friends, polluting the street and the lawn, or busily digging in somebody's yard, or yowling from darkness to dawn? Does he ride around on your auto seat, where your child or an orphan should be; or is he asleep on the parlor rug, or scratching and biting a flea? Does he work each day for his bed and board, and never do mischief or harm, while faithfully watching the kids and house, and all of the stock on the farm? If he's not worth while in some useful way and doesn't pay for his care and keep, consign the cur to the buried bowwows and end his raids on the sheep! If you don't attend to this job at once, you may have a big bill to pay, for your dog may join in a killing bee, when you are from home some day. Or worse than that, he may go raving mad, bringing death to people and stock, yet all the dogs in all of the world can't pay for a person or flock. And food is too precious to throw away, on a vicious, worrying hound, while wool and mutton are needed by all, here at home and the world around. So do all you can to protect the sheep and have them increase and grow fat, to clothe and to feed all the people well, for there's right and sense in that. Then here's to the doom of the guilty dog, dig deeply his dishonored grave, and let no one mourn when he's put away, since his death means that lives we save.

A. S. Alexander, M. D. C.

Madison, Wis.

HOGGING DOWN RYE UNPROFITABLE

Hogging down rye is shown to be an unprofitable practice in pork extension in a three years' test at the Ohio Experiment Station. Moreover, since rye is as valuable as wheat for making flour farmers are being urged to cut and thresh the rye rather than to attempt to market it through hogs.

The average daily gain of hogs on rye was less than one-half of a pound, whereas when corn and tankage formed the concentrates and clover was used for pasture gains of more than one pound a day were secured. In addition it required 473 pounds of rye to produce 100 pounds of pork. The rye would have returned a greater profit if it had been sold as a cash crop.

Even when the hogs were allowed about one-fourth of a pound of tankage daily in addition to rye, they consumed 634 pounds of rye as compared with 266 pounds of corn for 100 pounds of pork produced.

PIG KEEPING

A new Defence of the Realm Regulation published in the *London Gazette* lays it down that it shall be lawful to keep pigs in any locality, premises, or place where they do not cause nuisance or injury to health, and no locality, premises, or place shall be deemed to be a place unfit for keeping pigs provided the permission of the local authority has been obtained. If the Board of Agriculture certify that a local authority has been unreasonable, the local government board may exercise powers as if it were the local authority. Where any permission has been granted under this regulation such permission shall not be withdrawn for five years. It shall be lawful for any local authority to erect or provide and maintain piggeries, and to purchase, keep, or sell pigs.—*Veterinary News*, London.

STATE LAWS AND SERUM PRODUCTION

(Continued from page 72)

trade of that great hog-raising state for Indiana industries. In the event that there should be a shortage of serum in Indiana, the hog-raiser would be absolutely at the mercy of hog cholera, because foreign companies would not be willing to ship virus in disobedience to a state law, even in case of an emergency.

In conclusion, anti-hog-cholera serum and virus, released for market by Federal inspection, is the best possible protection to the farmer and the hog-raiser. It is made in the most scientific manner, inspected and passed by the United States Department of Agriculture, and this is the hog-raiser's best and only protection.

The question should be left to the Federal Government, with its standardized methods, and its corps of expert doctors in charge of each and every U. S. licensed plant, and the state should not in any manner hamper the sale of interstate or state shipments of a product which is very valuable in preserving and creating as large a marketable supply of hogs as possible.

It is an interstate problem regulated by Congress, and the state legislatures' activities in this regard do not in any manner protect the hog-raiser, but have proven to be of serious injury and harm to him in the past. Neither the bonding laws, the arbitrary distance laws, nor laws which would prohibit the shipment of virus into a state, have any scientific basis or foundation. They are detrimental to the veterinarian, the farmer, the hog-raiser, and the marketable supply of hogs.